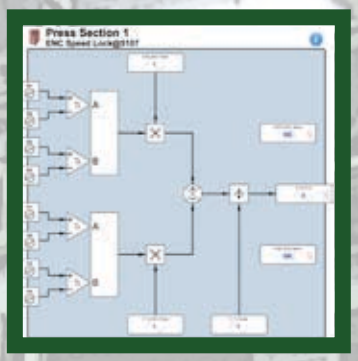
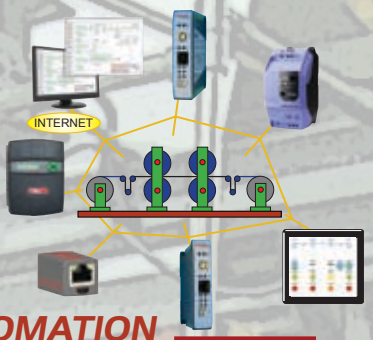
# Bardac DRIVES CATALOG 2015

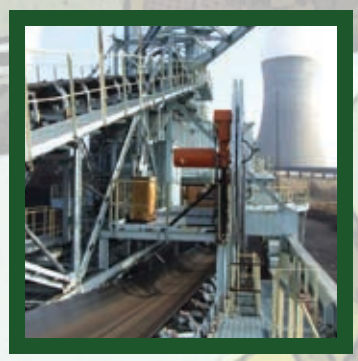
issue 2



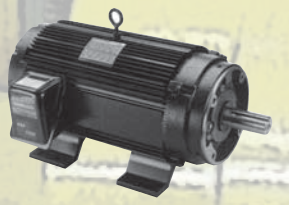



drive.web AUTOMATION

AC DRIVES



DC DRIVES



MOTORS

SERVICE

*Everything normally in stock!*

Since our founding in 1992 we have worked hard to build our reputation around key goals:

- Innovative technologies.
- Reliable products.
- Unrelenting customer support.
- All catalog items normally in stock.
- Competitive pricing.

***Nothing's changed!***

# *We're tough to beat!*

Our factory in Stevensville, Kent Island, Maryland

**Please visit us ...** take Route 50 East from Washington DC or Annapolis and cross the Chesapeake Bay Bridge to Kent Island … take Exit 37 (the first on Kent Island) Route 8 North, towards Stevensville … after 1/2 mile take the second left onto Schooner Parkway … then left onto Log Canoe Circle and we are the second building to your right … we look forward to seeing you.

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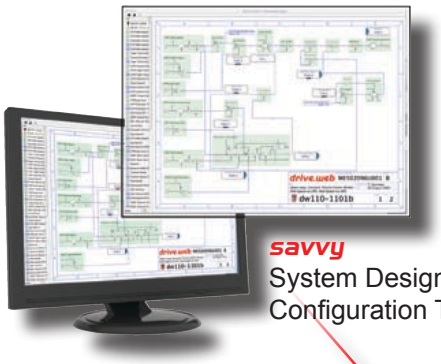
**Specifications** ... At the time of going to press we believe the information in this catalog to be accurate. However, the specifications of products may be amended at any time, so please check with us when ordering to ensure that such changes will not affect your requirements.

# drive.web
## SMART AUTOMATION

## CONFIGURE, CONNECT & CONTROL EVERYTHING ... IN ONE ENVIRONMENT



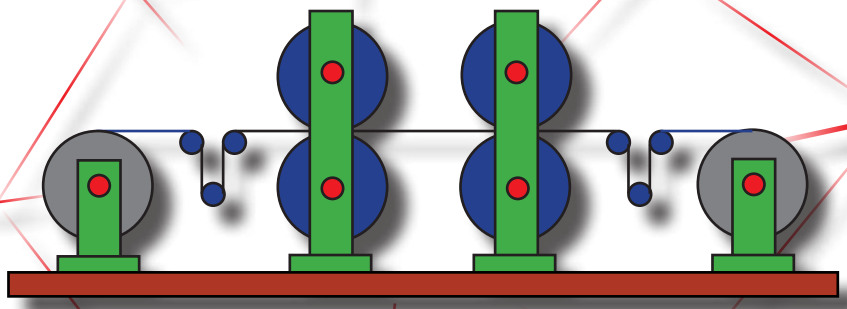
***savvy***
System Design & Configuration Tools

***smarty***
***Universal Automation Controller***
with comms ports

INTERNET

Ethernet

***speedy*** DC Drive Controller



***speedy*** AC Drive Controller

***speedy***
***Universal Automation Controller***
For embedding in drives & devices with Ethernet & USB port for total system access

Ethernet

***smarty***
***Universal Automation Controller***
& Distributed i/o

***savvyPanel***
Touch screen operator stations with control tools & WiFi “roaming”. For PC, iPad or iPhone

## COST EFFECTIVE INTEGRATION FOR SYSTEMS OF ANY SIZE OR COMPLEXITY

- ***Build and operate complete control systems over Ethernet***
- ***Program individual drives, controllers & operator stations***
- ***Make drag & drop connections between devices***
- ***Configure touch screen PC operator stations***
- ***Create roaming HMIs in iOS devices - iPad, iPhone, etc.***
- ***Provide Internet access to your entire system***
- ***Add utilities such as watchdogs, event emails, loggers, etc.***
- ***Support interfaces to existing devices via Modbus, EIP, etc.***

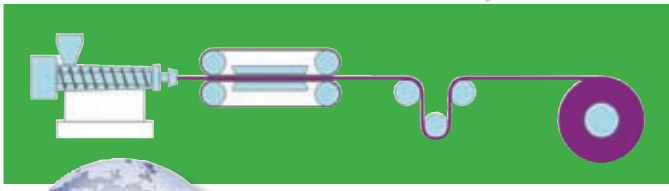
# drive.web automation

# total connectivity

Enterprise management - machine operators - system engi

## one world, one tool, one way

## save money



### savvy
**Graphical, function block tools**

- easy drive configuration
- powerful systems design & integration
- trend charts
- signal flow diagrams
- Internet access
- Intuitive system navigation tools

Internet
Remote system access

Ethernet

### savvyPanel
**Integrated touch screen HMI technology**

For touch screen
PC or iOS devices
(iPad, iPhone)

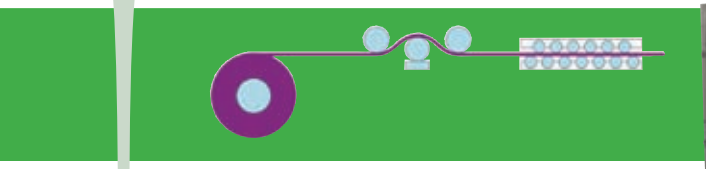
WiFi
*go mobile!*

### speedy & smarty
**Universal Automation Controller Networking**

Easy Ethernet field bus, EIP/PCCC, ModbusTCP/IP & others

Ethernet

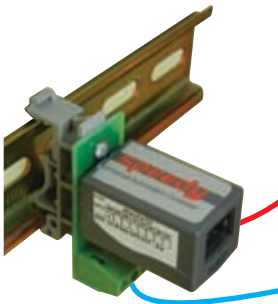
## save time



Ethernet

### speedy
**Integrated Universal Automation Controller**

- easy interfaces to existing third party drives & controls
- add Ethernet and USB device access
- boost network performance
- add full featured programmable control



## save resources

### smarty
**Universal Automation Controllers**

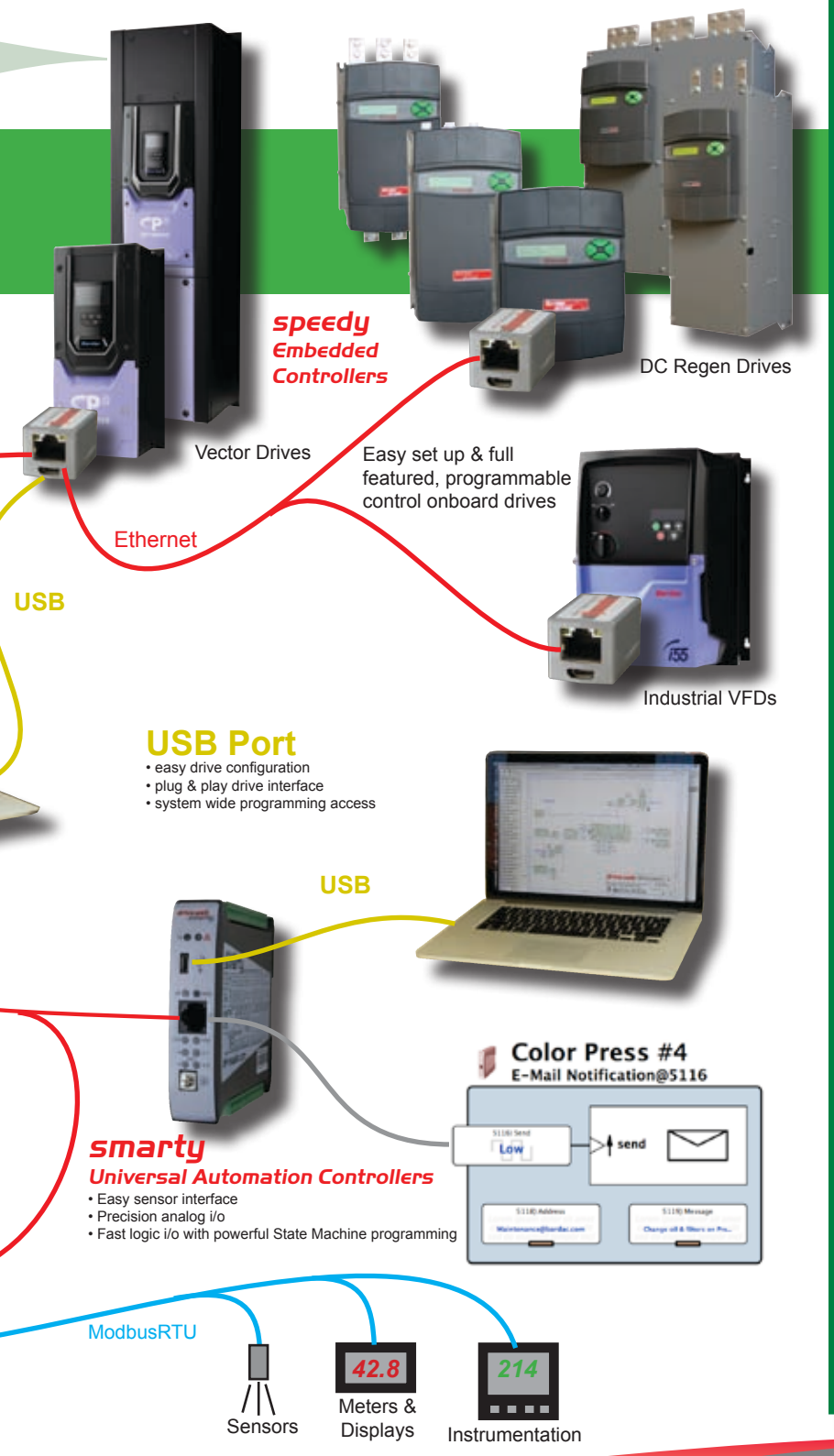
- 16 precision analog & logic i/o
- encoder i/o for indexing, registration, shaft lock
- multiple communications options
- unlimited expansion with no loss of system bandwidth

### speedy
**Universal Automation Controllers**

- Easy gateway to instrumentation
- Fast data collection
- Mount anywhere DIN option

# smart automation

## neering - production control - maintenance - tech support




# drive.web

## A Unique Architecture

1 ***drive.web*** devices (***speedy***'s and ***smarty***'s) connect peer to peer over Ethernet to form a completely homogeneous control environment.

2 ***drive.web*** devices provide a full featured programmable control environment. Each device processor contributes to the total system processing capacity so that as the system gets bigger its capacity increases.

3 An unlimited number of ***drive.web*** devices can be incorporated into a system to provide an unlimited amount of processing capacity and i/o with undiminished performance.

4 The ***drive.web*** devices store ***all*** the device and complete system configuration data including touch screen PC and iOS display data - everything!

5 A ***speedy*** embedded in a drive takes over the entire drive, its set up, control & memory management. It becomes an integral part of the drive and now looks just like the drive. Any actions from the drive keypad or terminals or serial ports are instantly synchronized.

6 ***savvyPanel*** touch screen PC and iOS display graphics and configuration data all resides in the ***drive.web*** devices so that you can roam to any WiFi location with your iPad and view a system (subject to access permission)

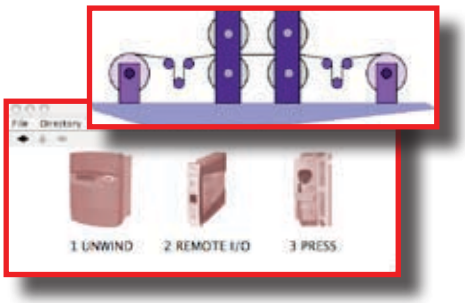
7 Easily create a graphical interface to almost any control device to bring it into your unique, homogeneous, ***drive.web*** environment.

# drive.web

**drive.web** uses distributed control over Ethernet to provide cost effective, high performance integration of drives & controls in systems of any size or complexity.

## 1 CONCEPT & PLANNING

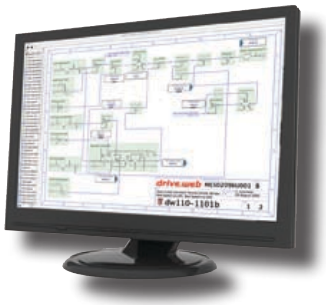
From your initial sketches and notes create ***drive.web savvy*** "Phantoms" offline to identify all your drives, remote i/o, MMI interfaces, gateways, etc.




From the initial concept, through planning, design, construction, testing, installatation and operation the ***drive.web savvy*** tools provide all the vision, insight and help you need for a successful project.

## 2 DESIGN & CONFIGURATION

Place any control function blocks you need then drag & drop between parameters in your "Phantoms" to make all your device interconnections. The ***savvy*** Signal Flow Diagrams and powerful navigation aids give you a clear intuitive view of your work. Information and help is always on the spot with hover text, links to the manual and contextual menus.



## 3 CONSTRUCTION & TESTING

Simply connect all your drives and devices together over Ethernet and load your complete design into the devices form just one location. The system immediately comes alive for testing and monitoring.

## 4 INSTALLATION & OPERATION

Use ***drive.web savvy*** to provide real time monitoring and control of your entire system from any location. No running from drive to drive to check the set up or operational state! Use ***savvyPanel*** operator station technology to provide smart touch and roaming control from anywhere.

## 5 MANAGEMENT & MAINTENANCE

Use ***savvy*** utilities to set up system performance criteria and monitor your productivity, machine state and process trends locally or remotely over the Internet.

# smart automation

The innovative ***drive.web*** technology provides total control in one homogeneous environment with the entire system database resident in the ***drive.web*** devices.

- **Configure & control individual drives & devices**
- **Design and operate complete drive systems**
- **Provide fast, peer-to-peer networking over Ethernet**
- **Create clear, graphical signal flow system documentation**
- **Easily interface to most other drives, MMIs, PLCs, etc.**
- **Build cost effective systems of any size or complexity**
- **Add Internet accessibility to your system**
- **Support worldwide enterprise integration**

## products

### savvy Tools

Intuitive, graphical system design and device configuration tools with powerful navigation features, drag & drop connections, trend charting and online help.

### savvyPanel Touch Screens

Innovative, touch screen operator station technology that runs on PC or iOS (iPad, iPhone, etc.). Build clear machine graphics, buttons, switches, meters and instrumentation and link to your control scheme. Provides multi-user, multi-level, password protected access via WiFi from anywhere to any system.

### smarty Universal Controller

A range of DIN mount ***drive.web*** programmable controllers with peer-to-peer networking over Ethernet or stand alone capability and a wide range of i/o and communications options. Intuitive, easy function block configurations are stored on board for instant field access.

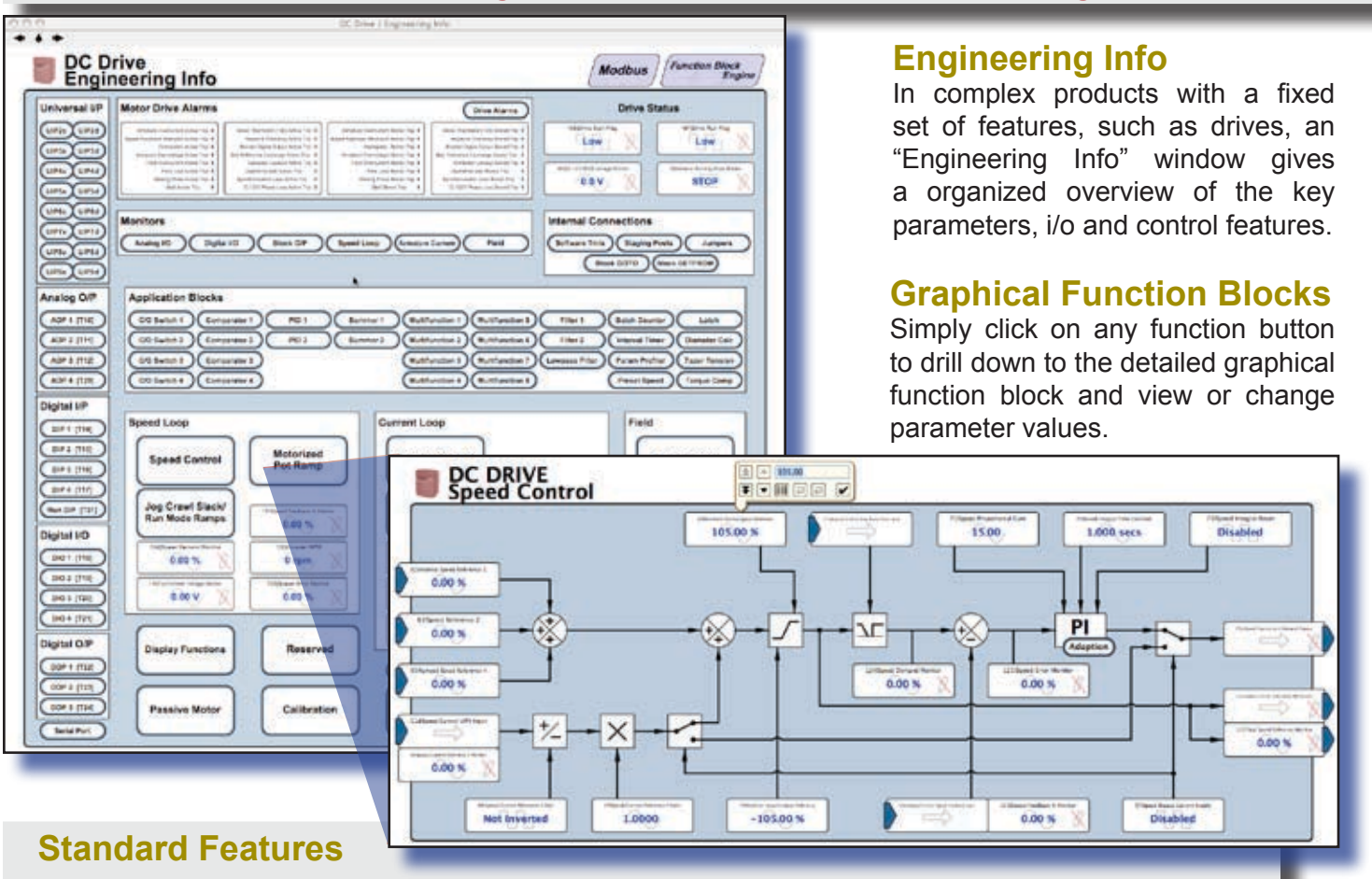
### speedy Embedded Controller

Miniature, low cost, ***drive.web*** programmable controllers for easy embedding in drives & devices. Includes peer-to-peer networking over Ethernet & USB port. Only 21x22x36mm!

# drive.web automation

## savvy ... the smart automation tool.

- Configure drives, controllers & operator stations
- Design & build complete systems of any size or complexity
- Network & operate drives & systems over Ethernet
- Provide multi-user, system wide access from anywhere




### Engineering Info

In complex products with a fixed set of features, such as drives, an "Engineering Info" window gives a organized overview of the key parameters, i/o and control features.

### Graphical Function Blocks

Simply click on any function button to drill down to the detailed graphical function block and view or change parameter values.

### Standard Features

- Online or offline design of drive systems using intuitive tools with pre-engineered function blocks.
- Internet access to drives and systems for remote configuration, monitoring and process training.
- Provides easy import, export and cloning of device configurations.
- Dynamic graphics show real time state of switches, indicators, parameter values, etc.
- Low cost, full featured, Distributed Control capability with peer-to-peer networking.
- Multiple users, local or remote, can have concurrent real-time access to drives or systems.
- Function Block Libraries for winder controls, PID, drive synchronization, arithmetic, logic, etc.
- Deterministic connections provide high performance links between drives, PLCs, Operator Stations, SCADA computers and other control products.
- "drag & drop" techniques make easy parameter connections between drives, control devices, etc.
- "Dock" feature enables key system parameters to be monitored and trended from one location.
- Powerful navigation features include drill down (to detail layers in drives and controllers), search, connection tags, jump, browse, pan and zoom for easy visual system comprehension.
- VPN (Virtual Private Networking) for secure Internet connectivity is supported.
- Password protection is provided at many levels for secure use.

## Get *savvy* free from www.driveweb.com

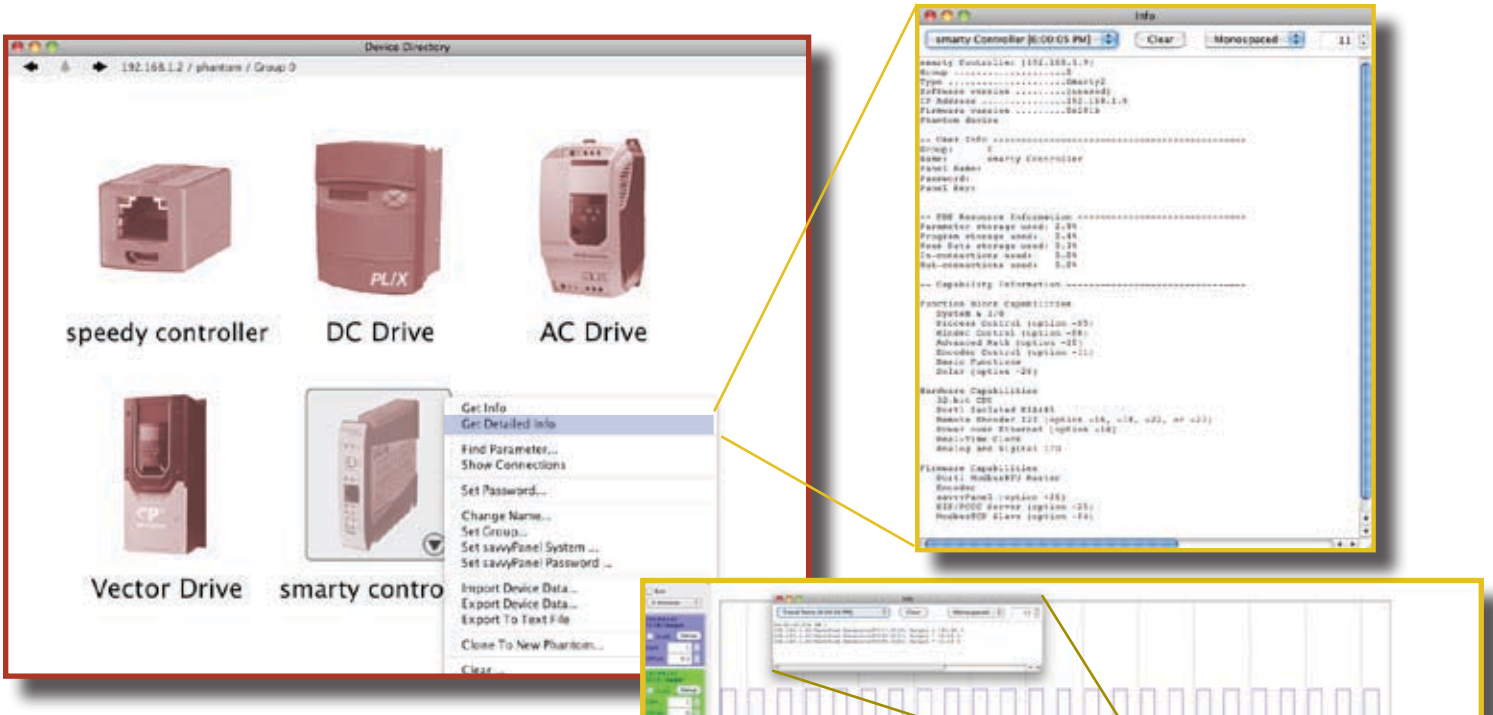
The *savvy* tools and utilities are platform independent and run on Windows, Mac OSX, Unix, Linux and Solaris and they are all automatically updated as new features are released.

Drives, programmable controllers, operator stations and complete systems are configured by making simple drag & drop connections between clear graphical function blocks.

## Information always at your finger tips ...

Anywhere in the system you will have easy instant access to the information you need with several different types of resource ...

- Right click on any active object such as a device, connection, parameter or function block to open the contextual menu
- "Hover" over any active object and see its key data appear at the top of the window.
- "Hover" over a button to see its function described.
- Look out for the information button. This will jump you to the relevant location in the user manual.
- The "Help" menu links you to the full user manual, and other getting started guides.

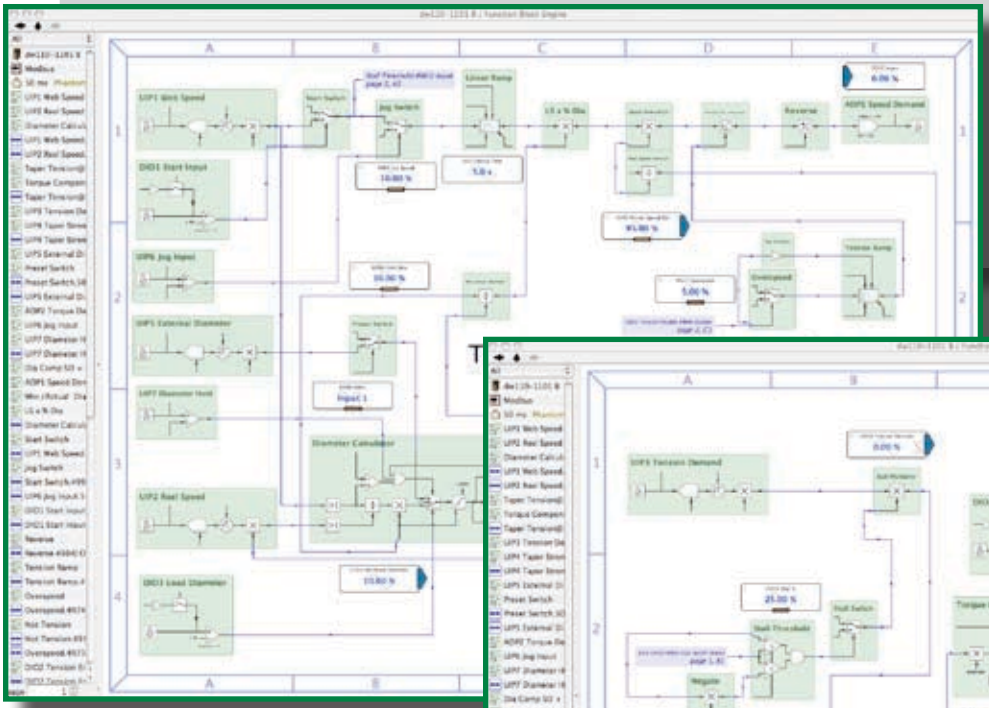



## Trend Charting

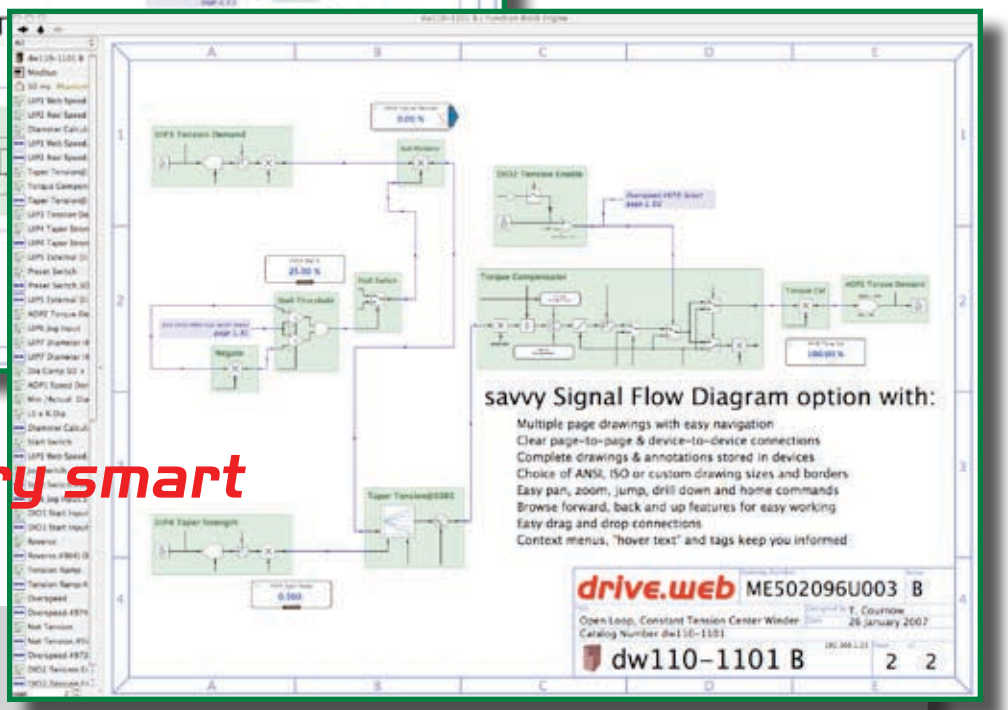
You can collect any parameters of interest in a "dock" window and display as a trend chart. The trend time scale can be adjusted from 10 seconds to 2 days and the data can be exported in a .csv format for separate spreadsheet analysis. Click on a point of interest to get the instantaneous, time stamped data values.

# savvy-SFD ... Signal Flow Diagram

The ***savvy-SFD*** option provides a powerful, graphical, Signal Flow Diagram interface with enhanced system wide navigation and the ability to produce clear, annotated, device and system documentation.



Use ***savvy*** “phantoms” to create systems which can be downloaded later into the real devices.


savvy Signal Flow Diagram option with:
Multiple page drawings with easy navigation
Clear page-to-page & device-to-device connections
Complete drawings & annotations stored in devices
Choice of ANSI, ISO or custom drawing sizes and borders
Easy pan, zoom, jump, drill down and home commands
Browse forward, back and up features for easy working
Easy drag and drop connections
Context menus, "hover text" and tags keep you informed
drive.web ME502096U003 B
dw110-1101 B

## savvy, easy, very smart

### savvy-SFD features

- Basic ***savvyPanel*** operator station functions included
- Create your own customized drawing sheets with choice of ISO or ANSI formats
- Signal flow diagrams provide a clear vision of your control scheme and its functionality
- Tags clearly specify the source, destination and location of connections between multiple pages.
- Entire drawing is stored in the ***drive.web*** devices for instant access in the field.
- Key parameters can be shown at the Signal Flow Diagram level for enhanced monitoring and control
- Connections are “rubber banded” so that function blocks can be moved on pages or between pages
- “drag & drop” connections can be made between any parameter anywhere in a system.
- Drawings can be user annotated.
- Powerful navigation features ensure fast searches and that you will never get lost.
- Password protection is provided at many levels for secure use.

# savvy programming

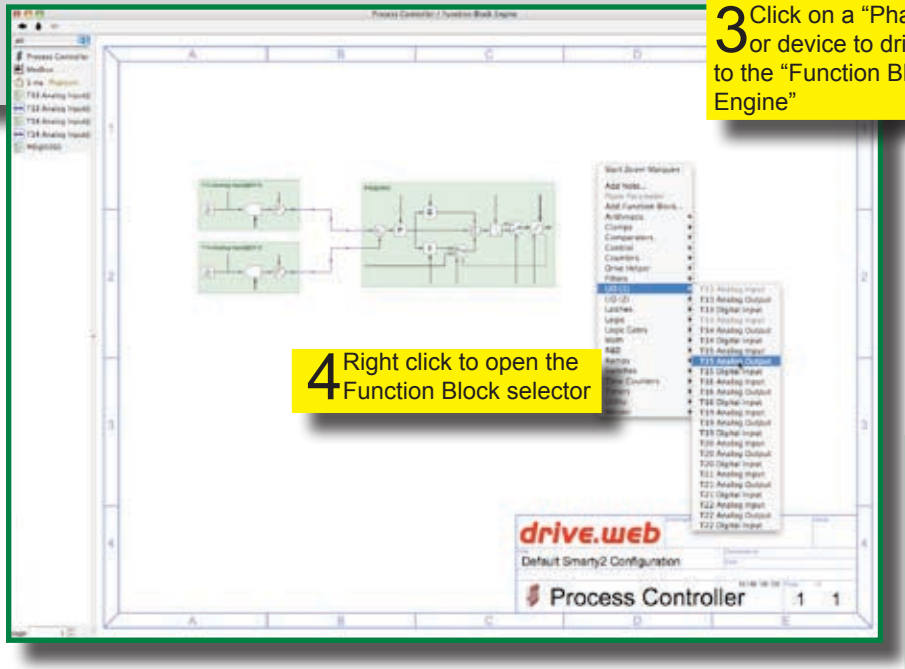
It could not be easier, whether simply configuring a drive or designing a complete integrated system.

A few simple steps are all that is needed to build a complete control scheme with signal flow documentation that is clear and easy to understand. Powerful navigation tools ensure that you will never get lost!

1 Create “phantom” devices or find real devices in your system in the “Device Directory” window.

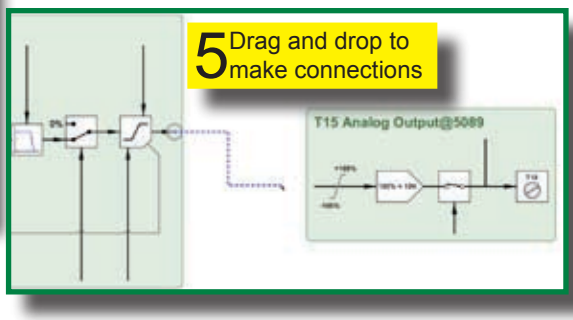
2 Right click on any device or object to open its contextual menu and get information, change names, import/export data, etc.

3 Click on a “Phantom” or device to drill down to the “Function Block Engine”

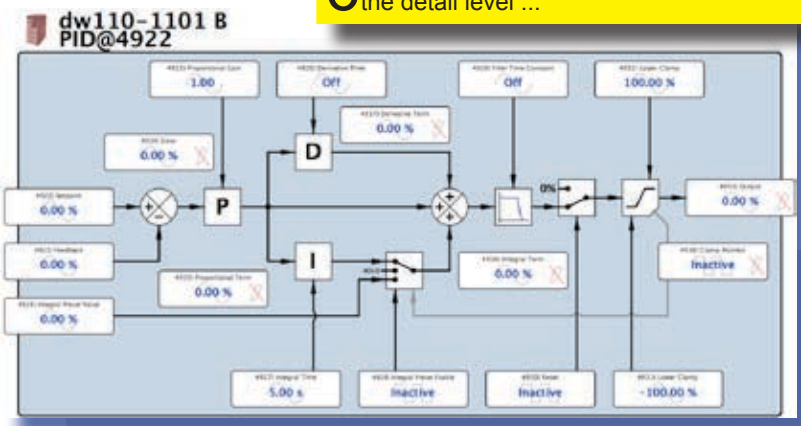



4 Right click to open the Function Block selector

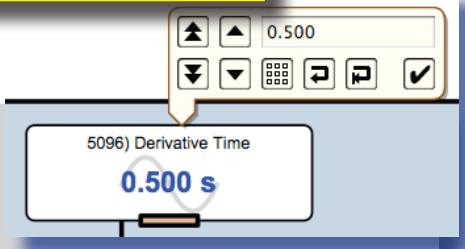
5 Drag and drop to make connections




6 Click on a Function Block to drill down to the detail level ...




7 Click on a parameter to change its value or state




Function Blocks are complete engineered system components. Their graphics are dynamic so that objects such as switches, indicators, etc., show their instantaneous state. A function block such as the PID above includes all the presets, resets, scaling, filters, clamps, etc., that you need for reliable implementation in the real world.

*savvy* is your smart friend! With a few simple clicks you can build a system, set up a drive and document your work in a thoroughly professional manner - there is no equal!

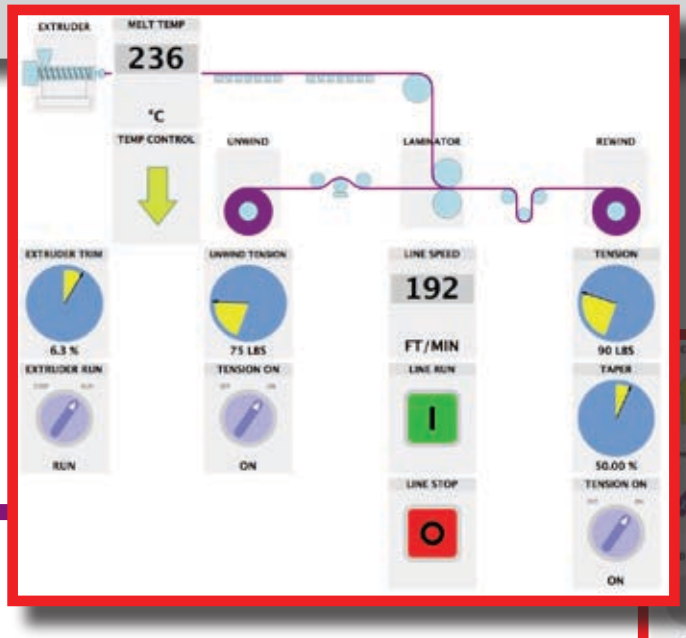
# savvyPanel

## Smart, touch screen operator station technology

Provides unprecedented flexibility in instrumentation, control and monitoring.

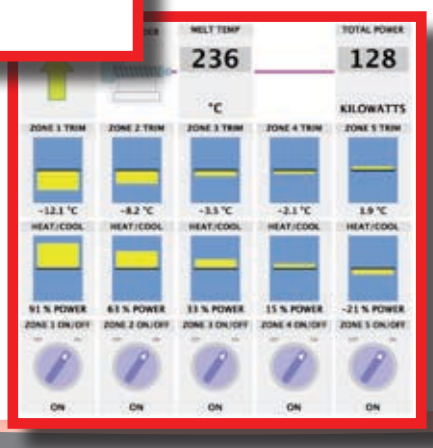
- Runs native on a ***savvyPanel station*** high resolution, touch screen display
- Also runs on any full featured, touch screen PC or on iOS devices (iPad, iPhone, iPod touch, etc.)
- Extensive library of objects such as pushbuttons, switches, meters, indicators, lamps, buzzers, etc.
- Extensive library of graphical image "tiles" to build smart machine and process graphics.
- Machine graphic "tiles" can be linked to detail control screens.
- Full ***savvyPanel*** configuration is stored in the ***drive.web*** devices for instant WiFi "roaming" access.
- Supports multiple screens with multiple pages.
- Provides hierarchal access to system groups, individual systems and multiple operator levels.
- Powerful multi-level password protection.

### *Example - Extrusion Coating Line*




**Master System Control Station**
Easily build your graphics and controls and link them to any location in your drives or process control system.

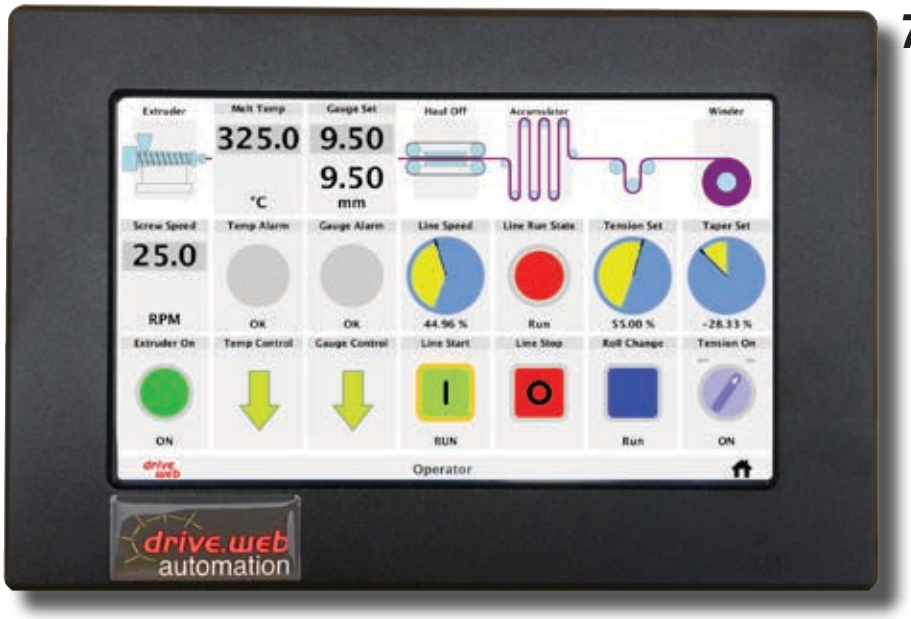
**Operator Screen**
Touch a graphic tile such as the "EXTRUDER" to drill down to the detail screen




**Total Control**
Touch an arrow link such as the "TEMP CONTROL" tile to drill down to the temperature control system

Touch the "MELT TEMP" tile in any screen to set the master temperature setpoint.

# savvyPanel touch




**Model dw230** - Compact size 8.1" x 5.5" x 1.1" (206x139x28 mm)

## 7" Color Touch Screens

- Plug & Play, ***drive.web*** native
- Splashproof front
- High resolution (1024 x 600p)
- Competitively priced.
- Easy set up.
- Crisp, high visibility graphics
- IP65, NEMA 4 splashproof front
- IP20 rear
- 1, Ethernet port 10/100baseTX
- Power supply 24VDC, 5W
- Working Temp: -20°C to 70°C
- Connect directly to any single ***drive.web*** device or to multiple devices with an Ethernet switch

## savvy programing

No separate ***savvyPanel*** programming required.
The ***savvyPanel touch*** display configuration resides in the ***drive.web*** drives or automation controllers. Everything is set up and accessed from the ***drive.web*** network using the intuitive ***savvy*** tools.

## very smart automation!

***enclosure for savvyPanel touch, 7"***

**Model dwOPTION-54**
Impact resistant, flame retardant, polycarbonate industrial enclosure. NEMA 4 (IP65), light gray.

Dimensions: 9.5" x 6.3" x 3.6" (241x160x92 mm)

## savvyPanel app for iOS

***Go mobile***
***Get secure machine access anywhere***

***Try it out now!***

Download ***savvyPanel*** free from the Apple App Store and get immediate access to a real, live drive system in Stevensville, Maryland, USA.

- Touch the "Roll Change" button to reset the length to zero
- Turn on all the section "On/Off" switches
- Touch the "Line Start" button - see the line run its auto cycle.
- Touch the "Set Speed" indicator to change the line speed
  - Touch the parameter name to get info
  - Touch the square display symbol to close the setter

## smarty & speedy ...

The ***drive.web smarty & speedy*** Universal Automation Controllers use distributed control over Ethernet to provide cost effective, high performance integration in systems of any size or complexity.

# automation without limits

## Smart distributed control concept:

- No system bandwidth degradation with systems of any size
- One completely homogeneous environment for drives, controls, operator stations, i/o - everything!
- Complete data consistency throughout a system
- The ability to store the entire system configuration in the controllers for easy field total access
- The ability to manage total system program thread and hierarchy
- Consistent multi-level password protection

## Key Features:

- Ethernet peer-to-peer networking
- Gateway options for ModbusTCP/IP, EIP CANopen and others
- Internet access
- Graphical Signal Flow Diagram system documentation
- Additional i/o
- Easy interface to most operator stations, PLCs, SCADA, etc.
- Event driven emails from devices

## Precision

- 16 bit integer basic arithmetic
- 32 bit floating point calculator functions
- 64 bit encoder pulse counting

## Standard *savvyPanel* library

For iPad, iPhone, iPad and touch screen PC operator stations with arrows, meters, start and stop pushbuttons.

## Standard function block library

- Adders, Subtracters, Multipliers, Dividers, Clamps, Switches, Logic
- Event driven email messages
- Full featured PI controllers

## Optional function block libraries

- Advanced Process Control & PLC
- Winder Control
- Advanced Math
- Encoder Position & Indexing

Standards:

CE, FCC part 15, IECS-003, (UL/cUL in late 2014)

# smarty Universal Automation Controllers

CE

c UL us LISTED

**Winders & unwinders**
**Web tension control**
**Process line multi-drive coordination**
**Position control**
**Indexing**
**Cyclic position control**
**"Electronic line shaft"**

**Spindle orientation**
**Registration control**
**Encoder feedback for open loop drives**
**Cut-to-length**
**Speed profiling, MOP & draw**
**Process recipe and mode control**
**Temperature & process control**

# smart fast easy affordable

*Smart, compact packaging*
*4" high x 4.75" deep x 0.9" wide*
*(102 x 120 x 22 mm)*

# smarty

## controllers with a wide range of i/o

Used for all programmable control, peer-to-peer Ethernet networking and system integration tasks.

## Standard Features:

- USB port for easy system wide programming and control
- Easy interface to most drives
- Use networked or stand alone
- Internet accessible
- Peer to peer deterministic Ethernet networking
  - 100baseTX or 10baseT Ethernet with auto-negotiation
  - Full duplex supported
  - Auto-MDIX per IEEE802.3ab (auto-crossover resolution)
  - Optional Power over Ethernet (PoE, IEEE 802.3af)
- ***drive.web*** distributed control
- Intuitive, graphical function block programming tools
- Complete graphical configuration & documentation data stored in devices
- 16 basic i/o terminals each configurable includes:
  - 8: ±10V, 16 bit analog in or out or 24V digital in
  - 8: 0-10V 16 bit analog in or 24/12/5V dig in or 24V dig out, source or sink
- Firmware field upgradable
- All circuit boards conformal coated for very high reliability
- SNTP server time/date synchronization support
- 100% backward compatible with all existing ***drive.web*** installations

## Optional Features:

- Full ***savvyPanel*** touch screen PC and iOS device capability
- Encoder input without marker
- 1 or 2 encoder inputs with marker and retransmit via external module
- 1 or 2 isolated or unisolated RS485 ports
- High voltage digital i/o isolator
- 6 additional digital inputs
- 4 channel 20KHz frequency i/o
- 24 channel extended digital i/o
- 2 channel stepper drive controller - pulse, direction & fast event inputs
- External thermocouple and RTD inputs
- ModbusTCP/IP, ModbusRTU, EIP/PCCC
- USB port for system wide programming

# speedy

## Embedded & onboard controllers

## for total systems integration

so small it's easy to miss,
so smart it's impossible to beat!

*Only 0.78" x 0.79" x 1.37" (20 x 20 x 35mm)*

take a closer look ...

- **The easiest, affordable way to get all your drives & devices up onto peer to peer Ethernet**
- **Improve your system bandwidth by reducing your RS485 network load**
- **Add full featured programmable control**
- **Same huge processing power as a *smarty***
- **100baseTX Ethernet peer to peer networking**
- **USB port for easy system wide programming**
- **Fast ModbusRTU or CAN bus device interface**
- **Very smart, very fast!**

CE c UL us LISTED

# Universal Automation Controller
# Unbeatable Performance

## speedy

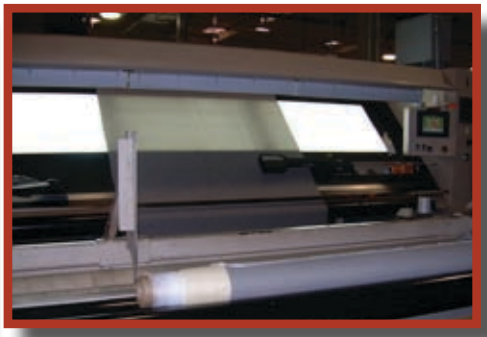
### miniature, full featured controllers

Serial interfaced on-board drives and third party devices via ModbusRTU or CANopen to provide low cost, improved performance, peer-to-peer Ethernet networking and full featured programmable control functions.

***So small it fits anywhere, does everything!***

Includes USB port for system wide programming and Ethernet ModbusTCP/IP. Available forms:

- Tether interface with either plug-in or 4-wire serial connection
- DIN rail mount with screw terminals
- Customized form for embedding into drives and devices

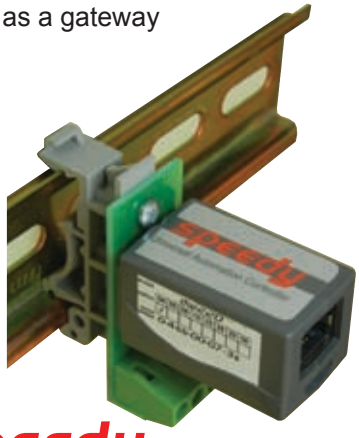


Film line winder

Cyclic indexing system

## *configure, connect & control ... everything!*

- Add unlimited processing muscle to your system
- Add peer to peer Ethernet networking
- Add easy USB system access
- Use as a gateway



**speedy**

DIN mount, free standing controller.

- Provide an Ethernet to ModbusRTU gateway to third party devices
- Provide extra system processing capacity & memory

**speedy**

for embedded or onboard control

**speedy**

embedded control

# smarty - Universal Automation Controllers

Smart controllers, DIN mount with 100baseTX Ethernet distributed control, USB port and wide range of i/o & communications options

16 standard i/o, each configurable as:
- 8: ±10V, 16 bit analog in or out or 24V digital in
- 8: 0-10V, 16 bit analog in or 24/12/5V dig in or 24V dig out, source or sink

**dw210** *smarty* for standalone or networked applications
General purpose programmable controller or drive interface controller

**dw212** *smarty* dedicated interface controller for ODE2 General Purpose AC Drives

**dw213** *smarty* dedicated interface controller for ODP Sensorless Vector Drives

**dw214** *smarty* dedicated interface controller for ODP2 Closed Loop Vector Drives

**dw215** *smarty* dedicated interface controller for Yaskawa F7 drive

See page 22 for other drive and device integration apps

**Only 104 x 23 x 120 mm!**

# speedy - Embedded Automation Controllers

**Only 21 x 22 x 36 mm!**

Mini smart controllers for use on-board or embedded in drives & devices with *drive.web* distributed control over 100baseTX Ethernet, ModbusTCP/IP, USB port, fast serial port (up to 500kbps) & communications options

**dw220** *speedy* generic on-board controller with 500kbps ModbusRTU master & 15" port cable

**dw221** *speedy* plug-in, on-board controller for PL/X series DC drive

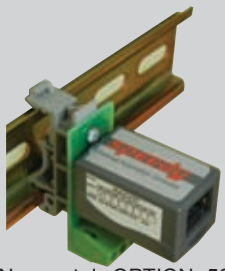
**dw222** *speedy* plug-in, on-board controller for ODE2 General Purpose drive

**dw223** *speedy* plug-in, on-board controller for ODP Sensorless Vector drive

**dw224** *speedy* plug-in, on-board controller for ODP2 Closed Loop Vector drive

**dw225** *speedy* on-board controller for Yaskawa F7 drive with 15" interface cable

see page 22 for other drive and device integration apps



DIN mount dwOPTION -50

**Easy, on-board & embedded automation for drives & devices**

**Very small, very smart, very affordable**

**Goes anywhere - does everything!**

High performance film winder

21 section embossing line

Airport transit car load sharing system

# Model Numbers

## smarty & speedy
## Product build options

| | | smarty | | | | | | speedy | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw210 | dw212 | dw213 | dw214 | dw215 | dw216 | dw220 | dw221 | dw222 | dw223 | dw224 | dw225 | dw226 |
| **Function Block Libraries** | | | | | | | | | | | | | | |
| -05 | Advanced Process Control Function Block Library (FBL) (comparators, profilers, presets, latches, filters, counters, timers, PIDs and more) | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -06 | Winder Control FBL (dia. calc., taper tension., torque comp.) | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -10 | Advanced Math FBL (trigonometric, log, exponential) | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -11 | Encoder Control FBL (shaft lock, indexing, registration for Options 40-44) | X | X | X | X | X | X | | | | | | | |
| -29 | Solar FBL with sun position calculator | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -36 | Motion Control FBL with trapezoidal motion & cam profile | X | X | X | X | X | X | X | X | X | X | X | X | X |
| **Communications Options** | | | | | | | | | | | | | | |
| -04 | Ethernet Modbus TCP/IP slave | X | X | X | X | X | X | S | S | S | S | S | S | S |
| -25 | Ethernet EIP/PCCC interface for AB PLCs | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -14 | Power over Ethernet (2W max external load) | X | X | X | X | X | X | | | | | | | |
| -17* | ModbusRTU slave (RS485) isolated port | X | X | X | X | X | X | | | | | | | |
| -18* | ModbusRTU slave (RS485) isolated port + external encoder module interface port | X | | | X | | | | | | | | | |
| -19* | ModbusRTU slave (RS485) isolated port + ModbusRTU (RS485) master unisolated | X | | | X | | | | | | | | | |
| -23* | ModbusRTU master (RS485) isolated port + external encoder module interface port | X | | | X | | | | | | | | | |
| **I/O Options** | | | | | | | | | | | | | | |
| -24* | 6 extra digital inputs, 24V | X | X | X | X | X | X | | | | | | | |
| -26 | *savvyPanel* iPad/iPhone & touch screen PC operator station interface | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -27* | Frequency i/o, up to 20KHz. 2 ~in, 2 ~i/o, with 12V, 400mA regulated power supply | X | X | X | X | X | X | | | | | | | |
| -28* | Extended digital i/o interface for Opto22 racks (24 channels) | X | X | X | X | X | X | | | | | | | |
| -30 | 115VAC digital i/o voltage isolator, up to 2 per smarty (not CE certified or UL Listed) (each with 2, NO contacts + common and 4, 115VAC inputs + common) | X | X | X | X | X | X | | | | | | | |
| -31 | 230VAC digital i/o voltage isolator, up to 2 per smarty (not CE certified or UL Listed) (each with 2, NO contacts + common and 4, 230VAC inputs + common) | X | X | X | X | X | X | | | | | | | |
| -37* | 2 channel stepper drive controller - pulse, direction & fast event inputs | X | | | X | | | | | | | | | |
| -38* | 2 ch. stepper drive controller - pulse, direction & i2i port for encoder option -42-45 | X | | | X | | | | | | | | | |
| **Encoder I/O Options** | | | | | | | | | | | | | | |
| -15* | Internal encoder input (2-24V, differential A & B (no marker) w/5VDC encoder supply) | X | X | X | X | X | X | | | | | | | |
| -16* | External encoder module interface port (i2i Port) | X | X | X | X | X | X | | | | | | | |
| | ***smarty* external encoder module (needs a *smarty* dw210 option -16, -18, -22 or -23)** | | | | | | | | | | | | | |
| -40 | 1 external encoder, 2-24V + marker, 5VDC encoder supply & two 24V event inputs | X | X | X | X | X | X | | | | | | | |
| or -42 | 2 external encoder, 2-24V + marker, 5VDC encoder supply & two 24V event inputs | X | X | X | X | X | X | | | | | | | |
| -45 | External encoder module RS422 retransmit outputs (±1A, ±1B, ±2A, ±2B) | X | X | X | X | X | X | | | | | | | |
| or -46 | External encoder module 24V retransmit outputs (±1A, ±1B, ±2A, ±2B) | X | X | X | X | X | X | | | | | | | |
| **Mounting Options** | | | | | | | | | | | | | | |
| -50 | DIN rail mount with screw terminal connections | | | | | | | X | | | | | | X |

dwOPTION -16-42
Encoder module

* Options are mutually exclusive X = Available if not excluded S = Standard feature

# drive.web automation

## smarty & speedy - stock controllers (un-configured)

### speedy & smarty standard programmable controller dwOPTION -00

- Basic drive coordination and peer to peer networking over Ethernet
- Basic machine control

**Includes 100baseTX Ethernet and USB port with system wide access together with:**
basic arithmetic, logic, PI control, clamp, switches, basic *savvyPanel* touch screen PC/iOS control, systems utilities, event email

### smart systems controller - pack 1

#### speedy & smarty dwOPTION -1121 for

- Process line drive coordination
- General purpose machine control

**Includes all standard controller features together with:**
advanced arithmetic, logic, process control, counters, timers, touch screen PC/iOS control, systems utilities

**Incorporates standard *drive.web* options**
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC and iOS operator station controller

### smart systems, winders & motion - pack 2

#### speedy & smarty dwOPTION -1122 for

- Full featured winder control with single or multi cores, turret indexing, auto splicing, open and closed loop, edging
- Web handling, tension control, accumulators, infeeds, center winding, slip core, surface winding

**Includes all *pack 1*,dwOPTION -1121 features together with:**
diameter calculation, linear and hyperbolic taper control, static/dynamic friction compensation, inertia compensation

**Incorporates standard *drive.web* options**
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-06, Winder Control Function Block Library
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC and iOS operator station controller
-36, Motion Control Function Block Library with trapezoidal & cam motion

### precision smart control with 1 encoder - pack 3

#### smarty dwOPTION -1123 for

- Basic precision speed, position or winder control
- Basic encoder count control

**Includes all *pack 2*, dwOPTION -1122 features together with:**
cyclic position, linear position, indexing

**Incorporates standard *drive.web* options**
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-06, Winder Control Function Block Library
-11, Encoder Control Function Block Library
-15, Single bidirectional encoder input
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC and iOS operator station controller
-36, Motion Control Function Block Library with trapezoidal & cam motion

# precision smart control with 2 encoders - pack 4

## smarty dwOPTION -1124 for

- Precision speed, position or winder control, registration, phase lock, fast event counting
- Encoder count control with home auto calibration
- Dual axis pick & place with trapezoidal motion
- Cut to length with cam motion control

**Includes all *pack 3*, dwOPTION -1123 features together with:**
registration, fast event counting, speed lock, phase lock, precision ratio

**Incorporates standard *drive.web* options**
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-06, Winder Control Function Block Library
-11, Encoder Control Function Block Library
-23, External encoder module interface port & ModbusRTU Master port
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC and iOS operator station controller
-36, Motion Control Function Block Library with trapezoidal & cam motion
-42-45, External dual, bidirectional encoder module with marker, fast event inputs, buffered encoder retransmit, 5VDC encoder supply

# precision stepper control with 2 encoders - pack 5

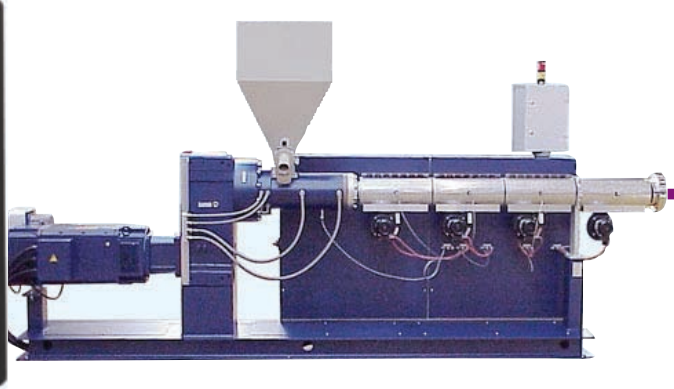
## smarty dwOPTION -1125 for stepper drive control

- Precision speed, position or winder control, registration, phase lock, fast event counting
- Encoder count control with home auto calibration
- Dual axis pick & place with trapezoidal motion
- Cut to length with cam motion control

**Includes all *pack 3*, dwOPTION -1123 features together with:**
registration, fast event counting, speed lock, phase lock, precision ratio

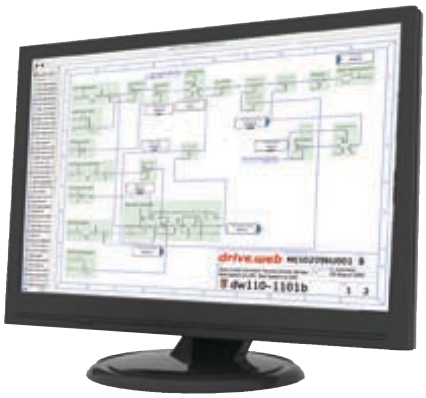
**Incorporates standard *drive.web* options**
-04, ModbusTCP/IP slave Ethernet
-05, Advanced Process control Function Block Library
-06, Winder Control Function Block Library
-11, Encoder Control Function Block Library
-25, EIP/PCCC Ethernet slave for Allen Bradley interface
-26, *savvyPanel* full featured, touch screen PC and iOS operator station controller
-36, Motion Control Function Block Library with trapezoidal & cam motion
-38, Dual stepper drive controller with external encoder module interface port
-42-45, External dual, bidirectional encoder module with marker, fast event inputs, buffered encoder retransmit, 5VDC encoder supply

dw230 ... *7" savvyPanel touch*



# drive.web automation

## drive.web device apps



These apps can be installed in ***drive.web speedy*** and ***smarty*** Universal Automation Controllers to provide a plug & play interface to the key features of "*other*" drives or devices. The ***smarty*** or ***speedy*** then brings those "*other*" drives alive with:

- Full featured programmable control functions
- Ethernet networking
- USB port access

*"Other"* devices include almost any device that has a ModbusRTU port, including:

**• AC drives • DC Drives • PLCs • Process Controllers •**
**• Temperature Controllers • Smart i/o • Power Controllers •**

***drive apps*** come complete with a user guide and application notes.

The configurations can easily be edited and additional drive parameters can be added using only the ***savvy*** tools.

**Current *"Other"* device app list includes:**

dwOPTION -4001 for Yaskawa A1000 Drives
dwOPTION -4002 for Yaskawa V1000 Drives
dwOPTION -4003 for Optidrive V2 Fan & Pump Drives
dwOPTION -4004 for Schneider Altivar 312 Series Drives
dwOPTION -4005 for ABB ACS310 Series Drives
dwOPTION -4006 for Sanyo Denki Stepper Drives
dwOPTION -4007 for Thermal Edge Temperature Controllers
dwOPTION -4008 for Optidrive V3 Series Eco Drives
dwOPTION -4009 for Fuji Frenic Mega Vector Drives

These ***drive.web device apps*** are easy for us to create, so don't hesitate to contact if you have a new request.

Please call +410-604-3400 for the latest list or a new *"other"* app.

## speedy device app

Connect a ***speedy*** to your "other" device via its ModbusRTU port to provide immediate ***drive.web savvy*** access to all its key parameters. Add any additional parameters you require to make ***savvy*** the only tool you need for your "other" drive configuration, control, systems integration and monitoring. The ***speedy*** is so small (about half the size of your thumb!) that it can easily be mounted unobtrusively onboard almost any drive or device.

## smarty device app

Connect a ***smarty*** to your "other" device via its ModbusRTU port to provide immediate ***drive.web savvy*** access to all its key parameters together with 16 extra precision i/o (configurable analog or digital), and with options such as encoder inputs, (see the options lists on pages 19 - 21). Add any additional parameters you require to make ***savvy*** the only tool you need for your drive configuration, control and monitoring.

# drive.web

**One easy, homogeneous solution for systems integtators!**

# drive.web apps

## CONFIGURED OPTIONS FOR smarty & speedy

These options are pre-programmed units with generic solutions for key applications. The packages are a great design aid.

These generic configurations are easily edited to suit your specific installation using **savvy** with the **SFD** Signal Flow Diagram option and include the following features:

- detail signal flow diagram documentation
- **savvyPanel** touch screen PC or iOS operator station configuration
- basic wiring drawing

| | | smarty | | | | | speedy | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | dw210 | dw212 | dw213 | dw214 | dw215 | dw220 | dw221 | dw222 | dw223 | dw224 | dw225 |
| -1101 | Open loop constant tension center winder (includes options 05, 06, 26) | X | | X | X | X | X | X | | X | X | X |
| -1102 | Closed loop dancer controlled winder (includes options 05, 06, 26) | X | | X | X | X | X | X | | X | X | X |
| -1103 | Closed loop loadcell controlled winder (includes options 05, 06, 26) | X | | X | X | X | X | X | | X | X | X |
| -1104 | Slip core winder controller (includes options 05, 06, 26) | X | | X | X | X | X | X | | X | X | X |
| -1105 | Speed lock with encoder feedback (includes options 05, 11, 16, 26, 42 & 45 or 46) | X | | | X | X | | | | | | |
| -1106 | Coordinated drive, line master controller (includes options 05, 26) | X | X | X | X | X | X | X | | X | X | X |
| -1107 | Controller networking for an analog/logic interface to drive (includes opts 05, 26) | X | | | | | | | | | | |
| -1109 | Phase lock, electronic line shaft + registration (opts 05, 11, 16, 26, 42 & 45 or 46) | X | | | X | X | | | | | | |
| -1110 | Three PID Controllers with integral reset and hold (includes options 05, 26) | X | X | X | X | X | X | X | X | X | X | X |
| -1113 | 2 Channel pulse train follower with ratio setting (includes options 05, 26, 27) | X | X | X | X | X | | | | | | |
| -1117 | Encoder cyclic position w/indexing (includes opts 05, 11, 16, 26, 42 & 45 or 46) | X | | | X | X | | | | | | |
| -1118 | Sun tracking for solar energy sys. (includes options 05, 11, 16, 26, 42 & 45 or 46) | X | X | X | X | X | | | | | | |

CE

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# drive.web accessories

- **Industrial Ethernet switches**
- **Interconnection cables, connectors**
- **Touch screen PCs**
- **Wireless access points**
- **Communications gateways**
- ***drive.web* software & firmware upgrade vouchers**

Please call +410-604-3400 for details

# drive.web automation

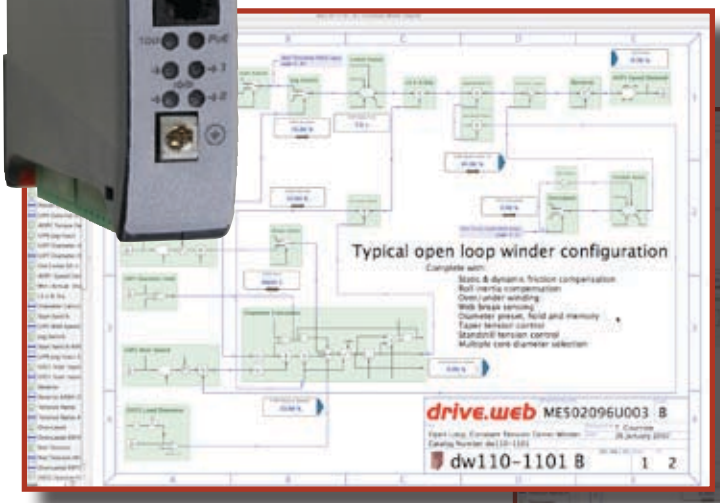
## drive.web apps

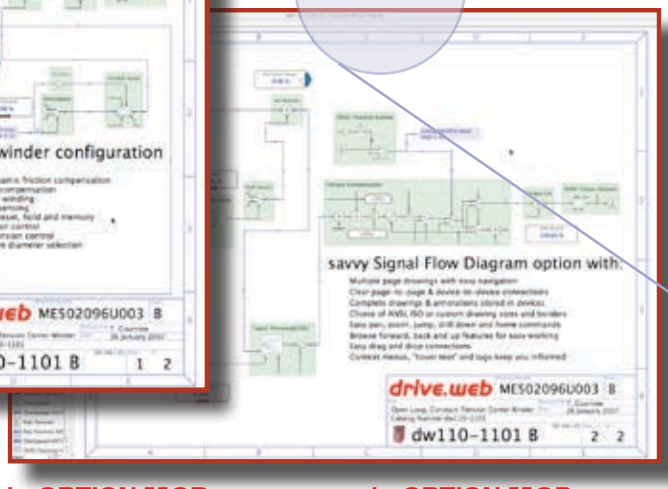
## WINDERS & UNWINDERS

***smarty*** automation controllers use the ***drive.web*** distributed control technology to bring easy, cost effective intelligence to high performance drive systems.

***smarty apps*** are pre-configured generic packages for common applications:

- ***smarty*** OPTION-1101 Open Loop Constant Tension Center Winder
- ***smarty*** OPTION-1102 Closed Loop Dancer Controlled Center Winder
- ***smarty*** OPTION-1103 Closed Loop Load Cell Controlled Center Winder
- ***smarty*** OPTION-1104 Closed Loop Slip Core Winder

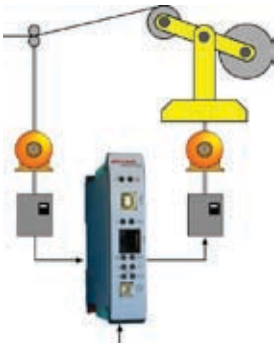


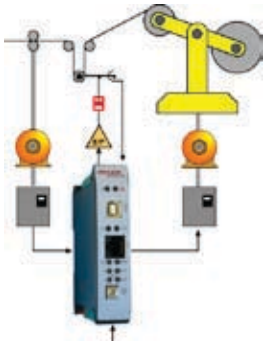

## web handling excellence

These generic configurations can easily be edited by the intuitive ***drive.web savvy*** graphical tools to suit the particular application. The clear signal flow diagrams are stored in the controllers for reliable access in the field.

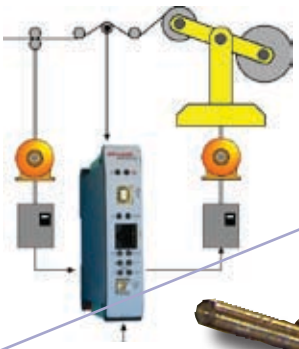
### *smarty* OPTION-1101 OPEN LOOP CENTER WINDER



### *smarty* OPTION-1102 DANCER CONTROLLED CENTER WINDER



### *smarty* OPTION-1103 LOADCELL CONTROLLED CENTER WINDER



***smart touch screen control***

**Standard features include:**

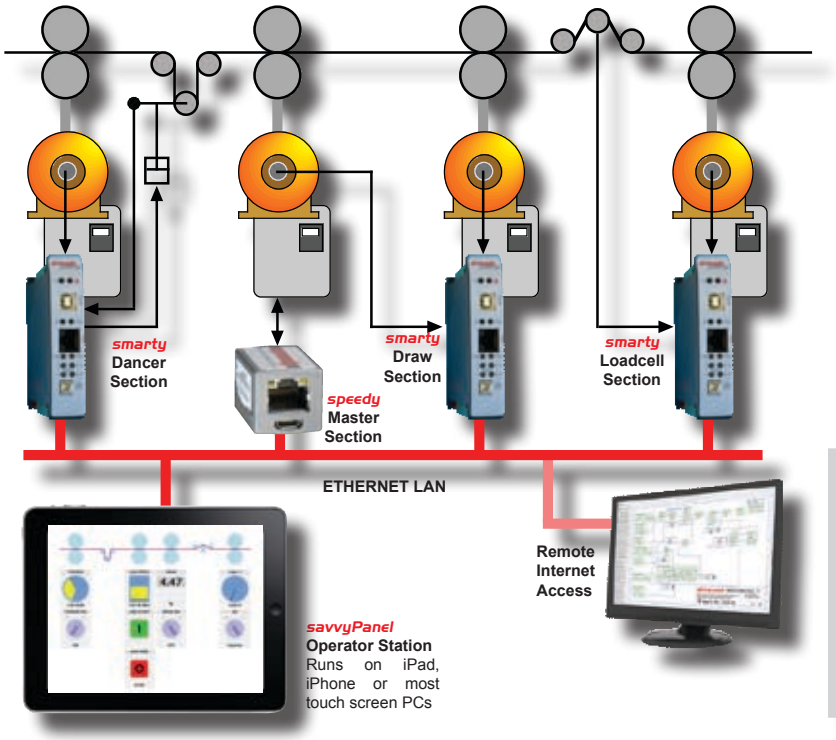
- Fully editable configurations and drawings
- Drive Interface either serial port or analog
- Process control & winder function block libraries
- Web break sensing
- Diameter calculation, memory, preset and hold
- Linear or hyperbolic taper tension
- Friction, inertia & torque compensation
- Multiple core presets
- Integral reset
- Adaptive control for high speed systems
- Standstill tension mode
- Jog/run/slack take up modes
- Turret indexing mode
- Anti-reverse clamps
- Core speed matching

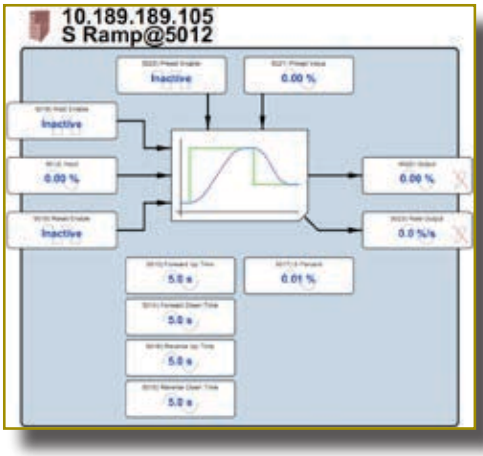
**Optional features include:**

- Over/under winding
- Line drive coordination
- Manual or auto-splicing modes
- Turret indexing
- Air pressure control
- Length & mass calculation
- Edge guide control
- Encoder inputs
- ModbusTCP/IP over Ethernet
- Serial communications
- ... and more.

## smarty app OPTION-1106 Process Line Coordination

Standard function blocks used in combinations of *smarty's* and *speedy's* can be easily configured to provide line drive coordination in systems of any size or complexity.

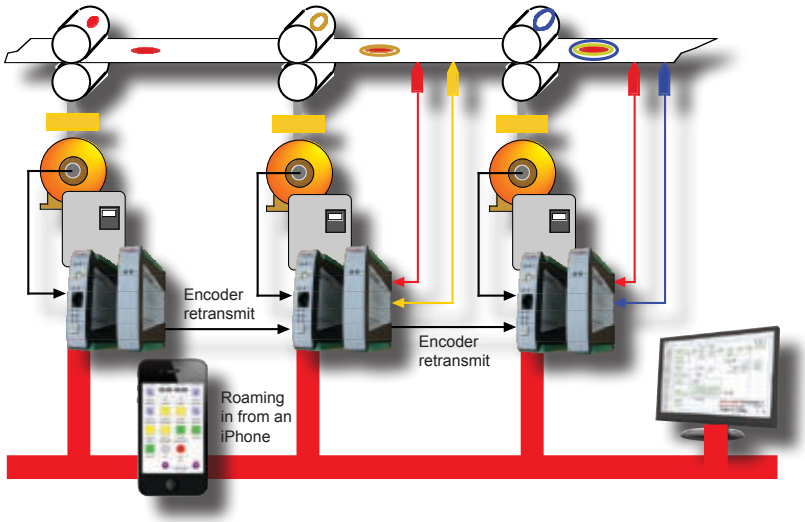


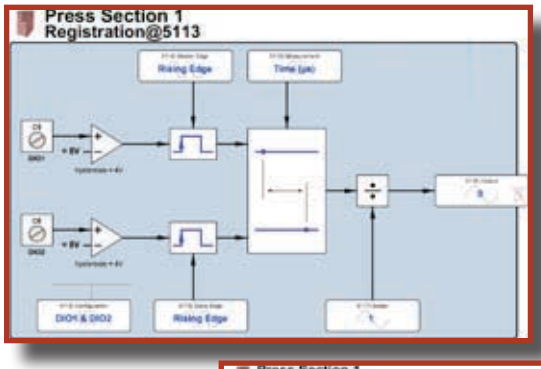



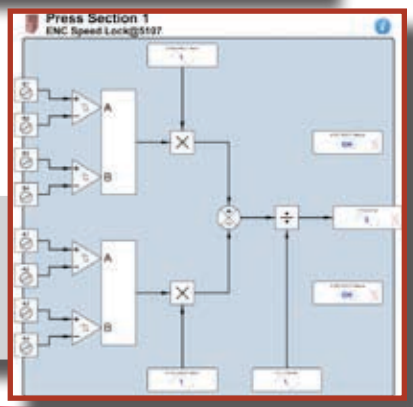

- Functions such as linear, S and hyperbolic ramps are used to provide master references.
- Programmable logic and switch functions are used to provide line run, line jog, local jog, interlocks, etc.
- PIDs, profilers, registration, indexing, phase lock and arithmetic blocks provide precise section control.

## smarty app OPTION-1109 Registration & Electronic Line Shaft

The Registration & Electronic Line Shaft package is designed for applications such as print registration, synchronized component handling, position control, cut-to-length, etc., where precision drive coordination and spindle orientation are required.




Standard graphical function blocks for registration and speed locking make these complex processes quick and easy to configure and use.

The encoder retransmit option provides buffered encoder signals for secure use in multiple locations.

# drive.web automation

## drive.web apps

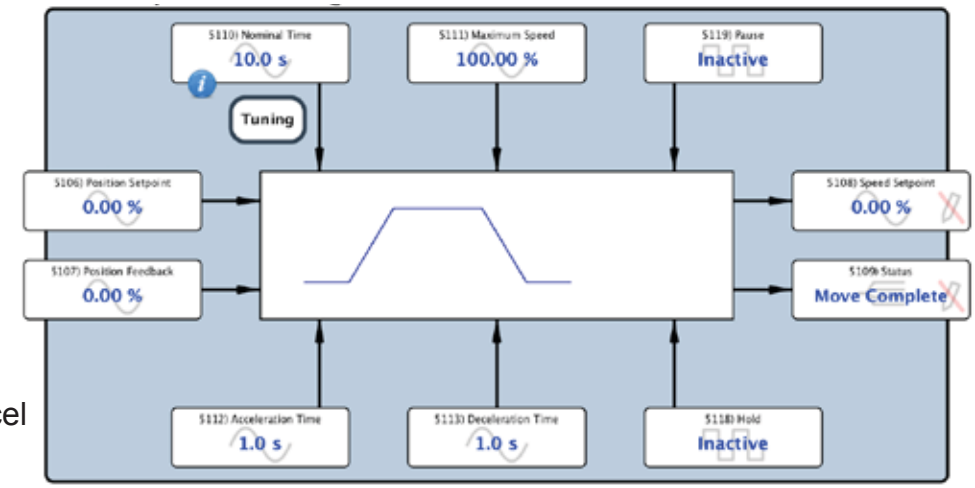
### motion control OPTION-36 Motion Control Function Block Library

For multi-axis motion control of all types of drives - AC drives, DC drives, servos, steppers, hydraulic, linear actuator, etc., in a wide variety of general industrial position control applications including:

- Pick & place machines
- Packaging machines
- Painting robots
- Cut to length
- Automated assembly processes

## Trapezoidal Motion

**A key requirement for numerous machine controls**

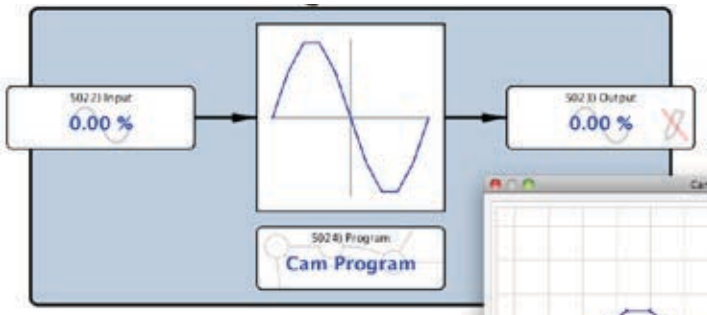


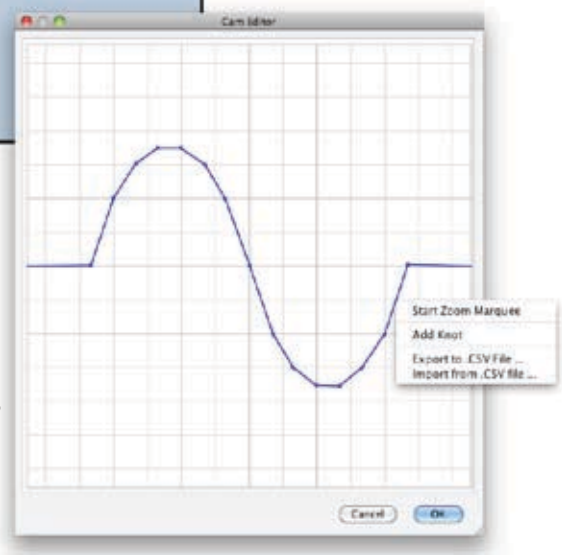

**Key Features:**

- Continuous target recalculation
- Easy system set up
- Easy performance optimization
- Pause with controlled accel/decel
- Hold with fast stop

## Cam Profile

**A key requirement for numerous machine controls**




**Key Features:**

- Easy graphical profile editor
- Optional .csv file import
- Easy .csv file export
- Easy system set up
- Easy integration with multiple axes
- Up to 100 “knots” or points for complex profiles
- 16 bit signed input and output resolution for accurate cam forms

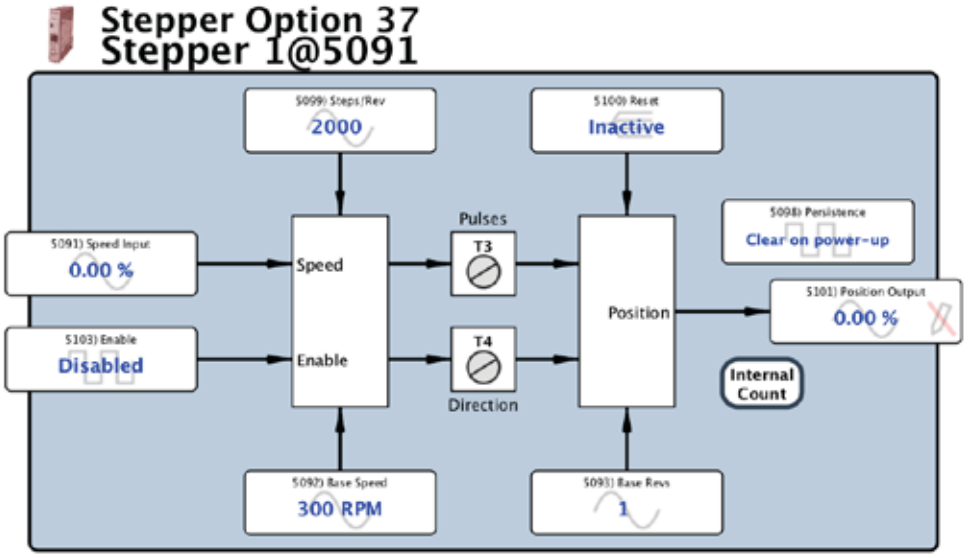
*very smart!*

# *motion control* Stepper Drive Controllers

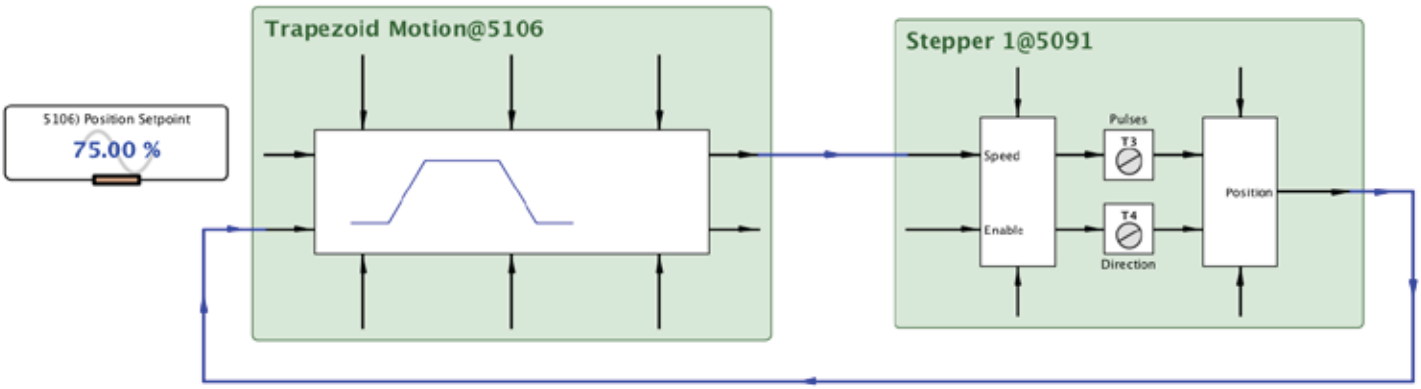
These stepper drive controller options are available for most versions of the smarty (see option selection table, page 19)

Both options include:

- 2 channels of pulse & direction
- 2 fast event inputs for count reset
- 64 bit pulse counts
- Automatic datum reset
- Easy set up
- Selectable count persistence with "clear on power up"

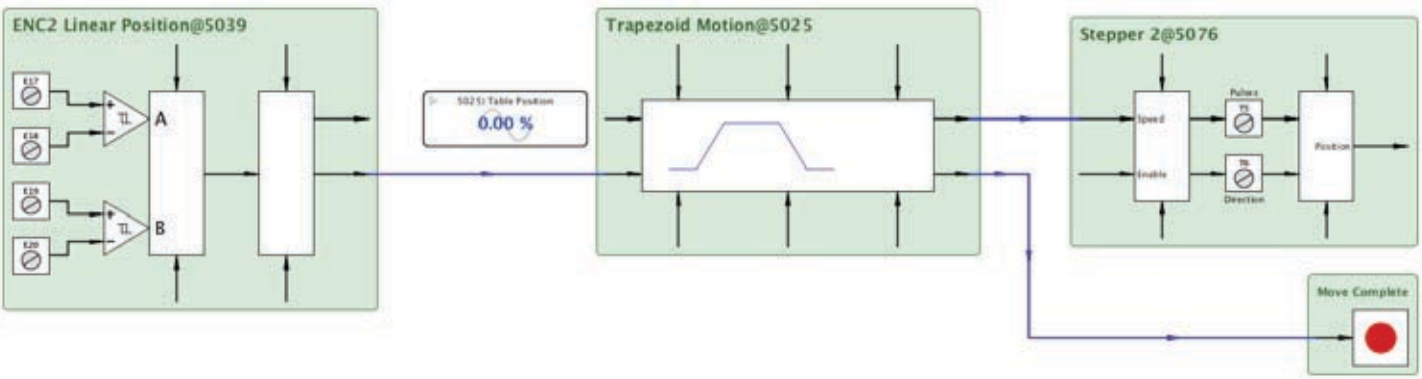



## dwOPTION -37 Open Loop Stepper Drive Controller




In a typical open loop stepper drive application the "Position" parameter (derived from the pulse count) can be used to close the position control loop

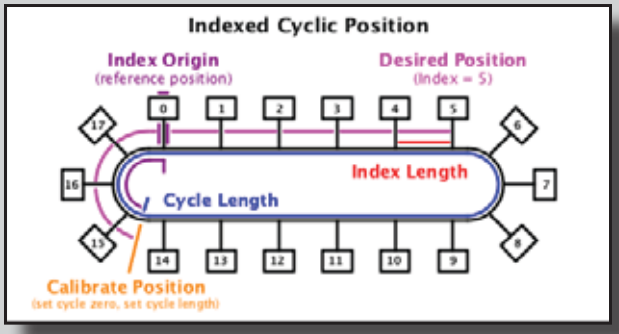
## dwOPTION -38 Closed Loop Stepper Drive Controller




In a typical closed loop stepper drive application the position feedback can be provided by an encoder. The dwOPTION -42-45 encoder module also has two fast event inputs for auto count reset.

# drive.web automation

## smarty app OPTION-1117 Indexing & Cyclic Positioning

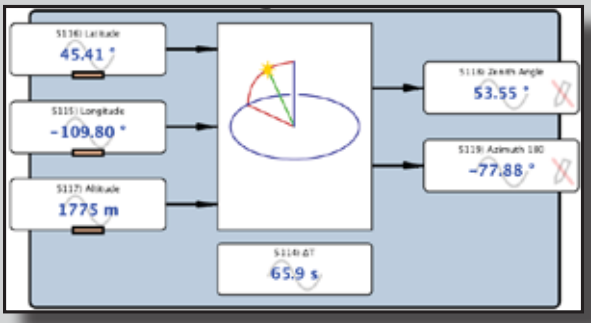



The optional Encoder Function Block Library available in the *smarty* includes a set of engineered function blocks for use in precision positioning applications such as packaging machines, machine center tool loaders, inventory carousels, stackers, etc.

### Key Features

- Auto origin checking
- Auto index calculation
- Auto calculation of shortest move from point to point
- 64-bit encoder counts

## smarty app OPTION-1118 Sun Position Calculator




The Solar Function Block Library provides precise calculation of the sun zenith and azimuth angles in solar energy systems. It can be synchronized with the SNTP server time and date and include a ∂T input parameter to compensate for the difference between UTC and Terrestrial Time for precise positioning of solar concentrators.

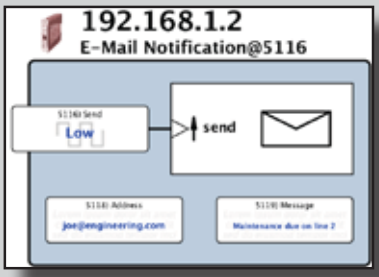
### Key Features

- Set up for any latitude, longitude and altitude.
- Fast calculation for use in mobile systems.
- SNTP synchronization support
- Terrestrial Time correction input.

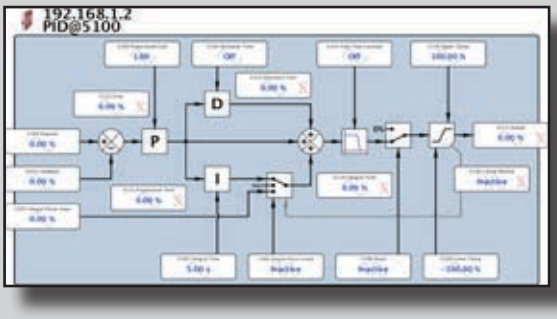
## smart utilities smart utilities

The E-Mail function block available in every *drive.web* device enables you to send alerts, event notices, status reports, etc., to management, quality controllers, plant engineers in any location.

It is easy to set up and it ensures that key process issues are delivered to the right place at the right time.



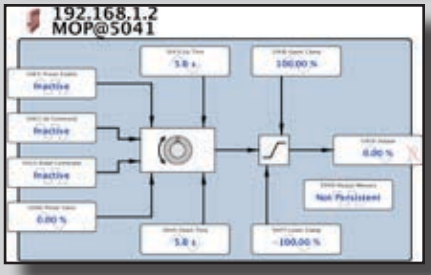

## smart function blocks




### smart PID

One of the most commonly required functions in industrial control. In most PLCs you get the basics but you are left to sweat the details required to make it work reliably in the real world. We cover the bases by including, integral preset, reset and hold, output filter, upper and lower clamps.

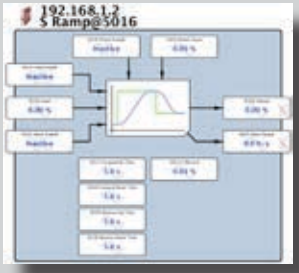
*Saves a lot of time and heartache!*




### Motorized Pot

This MOP block makes short work of figuring out all the functions you need for raise/lower push button control

*No sweat!*




### S-Ramps

Ever tried to create an S-Ramp that works predictably in a typical PLC? We make it easy, intuitive and reliable!

*No problem!*

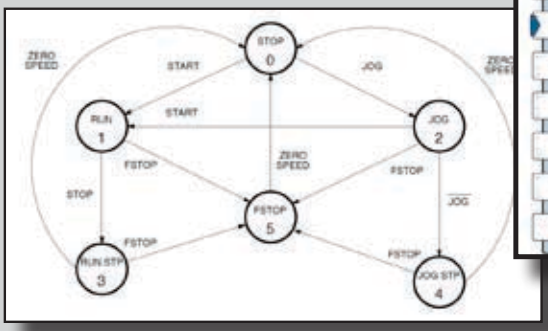
# *smart function blocks* State Machine Logic

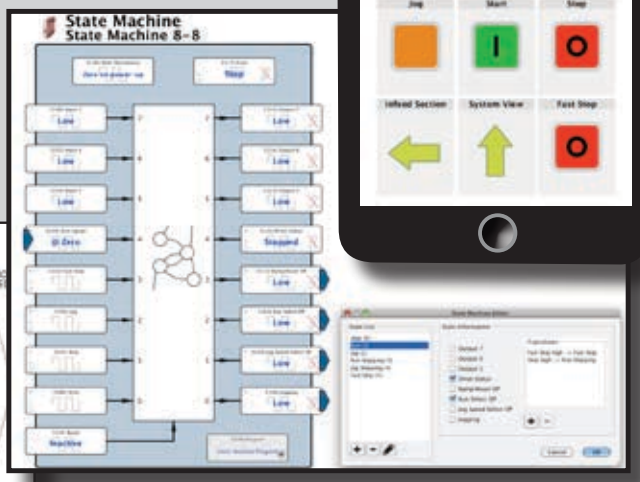
## *Logic made easy and reliable!*

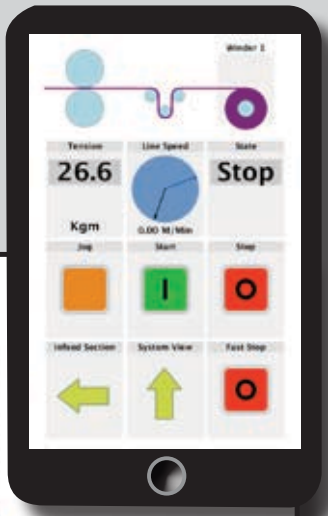
This powerful, Intuitive, 21st. century technology takes the stress out of logic programming. It's very simple ..

1. Define your machine states such as STOP, RUN, JOG, FAST STOP, etc.
2. Define the transitions that get you from one state to another, for example:
   START button gets you from STOP state to RUN state
   JOG button takes you from STOP state to JOG state
   FAST STOP button takes you from any state to FSTOP state
   (this can then look for a transition to ZERO SPEED before returning you to the STOP state)

*It's that simple! No more sweating over relay interlocks, contact races, etc!*




***So obvious!***

***So smart!***

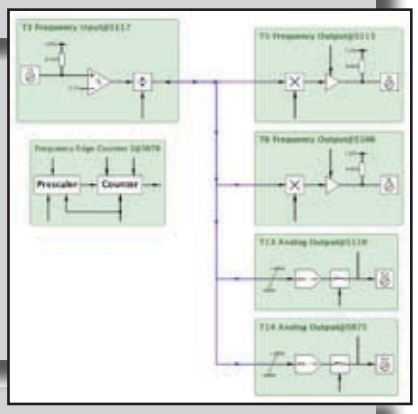
***So easy!***

## Frequency follower made easy

The frequency input/output function blocks allow you to easily create multiple frequency master/follower configurations that can be either open or closed loop. You can easily monitor, count and reset pulses to build position control systems with easy interfaces to any drive via frequency, analog or serial ports.

Easy interface to stepper drives with either pulse & direction or forward & reverse pulses.

You can easily add graphical touch screen interfaces using the ***savvyPanel*** technology.




# *drive.web* smart ideas

### WiFi Roaming Interface

There are many inexpensive third party WiFi routers that when plugged into a ***drive.web*** Ethernet network provide secure, robust, roaming system access in an industrial environment using an iOS device such as an iPad or iPhone.

### Enterprise Integration

The powerful system wide access inherent in the ***drive.web*** technology provides a great backbone on which to build integrated solutions in your entire global enterprise without additional complex data processing requirements. Multilevel password protection enables safe access for offsite accountants, production controllers and corporate management.

### Online Training & System Support

The IP addressing capability in every ***drive.web*** device ensures easy support for field service and live online training for machine operators, system designers and plant maintenance engineers. If an internet connection is available near your machine or process it takes less than 1 minute to set up a live connection to our engineers or any other off site location. ***drive.web*** provides system wide access from any single location on your LAN - very smart, very easy!

## P2 Series
## Closed Loop Vector

High performance coordinated drive for:
- Process automation
- Converting
- Printing
- Machine tools

Up to 100 HP at 230 volts
Up to 400 HP at 460 volts
Up to 150 HP at 600 volts

**IP20 package up to 15 HP - 50°C ***
**Optional NEMA 4X (IP66) to 10HP - 40°C ***
**NEMA12 (IP55) 15 to 250 HP - 40°C ***
*** Approvals: UL, CE, C-Tick**

Closed loop speed better than 0.1%
150% overload, 60 secs (200%, 4 secs)
Up to 200% torque at zero speed
AC Induction & PM motor modes
Built in brake transistor
EMC filter
Quiet - with switching up to 32KHz
DC Bus sharing
Safe Torque Off function
(IEC61508 SIL 2 & IEC62062 SIL 2)
Modbus or CANopen port
Plug-in control terminals

**Options**
***drive.web*** programmable control
Extended i/o
EIP, ModbusTCP, ProfibusDP, DeviceNet
OLED display
Remote keypad
***savvyPanel*** touch screen HMI

## V3 Series
## Energy Efficient Drives

Variable torque, fan & pump drive for:
- HVAC
- Building systems
- Climate control
- Flow control

Up to 60 HP at 460 Volts

**NEMA4X (IP66) to 15HP - 40°C (indoor) ***
**NEMA12 (IP55) 15 to 60HP - 40°C ***
*** Approvals: CE, C-Tick, (UL in 2015)**

Low input harmonic current distortion
Compliant with EN61000-3-12
>98% drive efficiency
Low audible motor noise
Internal EMC filter
Smart energy optimization
Resonance avoidance
Sleep/wake functions
Intelligent maintenance intervals
110% overload, 60 secs
Motor flux braking
ModbusRTU, BACnet
OLED display

**Options**
***drive.web*** programmable control
Extended i/o
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
Power disconnect
***savvyPanel*** touch screen HMI

## V2 Series
## HVAC Variable Torque

Variable torque, fan & pump drive for:
- HVAC
- Water treatment
- Climate control
- Flow control

Up to 100 HP at 230 volts
Up to 350 HP at 460 Volts

**IP20 package up to 15 HP - 50°C ***
**NEMA4X (IP66) to 15HP - 40°C (indoor) ***
**NEMA12 (IP55) 15 to 250HP - 40°C ***
*** Approvals: UL, CE, C-Tick**

Smart energy optimization
110% overload, 60 secs
Motor flux braking
Quiet - with switching up to 32KHz
Power loss ride through
Drive fault auto bypass
Sleep mode with auto-boost
Fire override mode
Pump blockage detect/clear
Pump clean, dry & preheat modes
Pump cascade control
ModbusRTU, BACnet

**Options**
***drive.web*** programmable control
Extended i/o
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
Power disconnect
***savvyPanel*** touch screen HMI

# TOUGH DRIVES FOR INDUSTRY

## E2 Series
## General Purpose VFD

Constant torque, heavy duty drive for:
- General purpose machine control
- Pumps and blowers
- Conveyors
- Mixers

To 1.5 HP at 110V in, 230V 3Ø out
To 5 HP at 230 volts
To 15 HP at 460 Volts

**Standard IP20 - 50°C**
**Optional NEMA 4X (IP66) to 10 HP, 40°C**
**Approvals: UL, C-UL, CE, C-Tick**

150% overload, 60 secs (175%, 2 secs)
Spinstart into rotating motor
Built in brake transistor (sizes 2 & 3)
Motor flux braking
Adjustable skip frequency
Quiet - with switching up to 32KHz
Power loss ride through
ModbusRTU port
Configurable i/o
Simple programming
On board help card
DIN rail and foot mount (IP20) (size 1 & 2)

**Options**
***drive.web*** programmable control
Extended i/o
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
***savvyPanel*** touch screen HMI

## NEMA 4X - IP66 Series
## For Harsh Environments

**P2 Series Open/Closed Loop Vector Drives**
**E2 Series General Purpose VFDs**
- Food processing
- Agricultural, water treatment
- Mining, cement, petrochemical

To 1.5 HP at 110V in, 230V 3Ø out
To 5 HP at 230 volts
To 10 HP at 460 Volts

**Standard NEMA 4X (IP66) - 40°C (indoor)**

**Approvals: UL, C-UL, CE, C-Tick**

Open & closed loop vector or V/Hz
Washdown, dust tight
Chemical resistant ABS enclosure
Corrosion protected heat sink
Spinstart into rotating motor
Built in brake transistor (sizes 2 & 3)
Motor flux braking
Adjustable skip frequency
Quiet - with switching up to 32KHz
Power loss ride through
ModbusRTU port
Compact packaging

**Options**
***drive.web*** programmable control
Power isolator switch, speed pot, F/R switch
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
***savvyPanel*** touch screen HMI

## E2 Single Phase VFD
## For SP & PSC motors

Variable torque, fan & pump drive for:
- Fans & blowers
- Centrifugal pumps
- Fume extractors
- Air flow control

To 0.75 HP at 110 Volts
To 1.5 HP at 230 Volts

**Standard IP20 - 50°C**
**Optional NEMA 4X (IP66) - 40°C(indoor)**

**Approvals: UL, C-UL, CE, C-Tick**

For motor types:
- Shaded Pole (SP)
- Permanent Split Capacitor (PSC)

Built in brake transistor (size 2)
Motor flux braking
Adjustable skip frequency
Quiet - with switching up to 32KHz
Power loss ride through
ModbusRTU port
Innovative smart boost start
Simple programming
DIN rail and foot mount (IP20)

**Options**
***drive.web*** programmable control
Extended i/o
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
***savvyPanel*** touch screen HMI

# OPTIDRIVE P2

## SYSTEMS VECTOR DRIVES

- High performance
- Induction & PM Motor Control
- NEMA12 packaging 15 - 250HP
  with through panel mount option

## 0.5 TO 400 HP

### FEATURES

Multiple Modes:
- Closed Loop Vector for high performance
- Open loop PM Motor Control
- Sensorless vector & V/Hz control

Up to 200% torque at zero speed
Sensorless speed regulation better than 1%
Torque control
DC bus sharing
Safe Torque Off function
Output to 500Hz (V/F Mode), 100Hz (Vector Mode)
Built-in 100% rated DB transistor up to 350HP
Integral PI controller
***drive.web savvy*** function block programming
Silent running with up to 32KHz switching
200% starting torque
Bipolar 12 bit analog input (isolated +/-10V or 4-20mA)
ModbusRTU, RS485 port
CANopen port
Filters & DC chokes 25-250 HP
Single phase input up to 125 hp
Power loss ride through
Process control options
Programmable i/o
Hours run log & trip log
Cartridge fans for easy maintenance (NEMA12 drives)
Options:
- Encoder feedback
- Additional basic & ***smarty*** i/o options
- EIP, Modbus TCP/IP, Profibus, DeviceNet, BACnet
- Memory stick with bluetooth interface
- Remote keypad
- 2Khz output in V/Hz mode
- OLED text display

### Smart drives for high performance coordinated drive systems and precision machine control

- Printing presses
- Extrusion & coating lines
- Automated assembly
- Indexing & registration
- Winders & web tension
- Material handling
- Cranes & hoists
- Textiles & fibres
- Metals industry
- Paper & cement mills
- Mining

**NEMA 4X washdown models - see page 40**

**STANDARDS**

UL, CE, C-Tick on all models

# P2 very smart drives

The *drive.web* automation technology uses distributed control over Ethernet to provide cost effective systems integration for systems of any size or complexity.

***savvyPanel touch***

Easy, high resolution, NEMA4, touch screen operator stations.

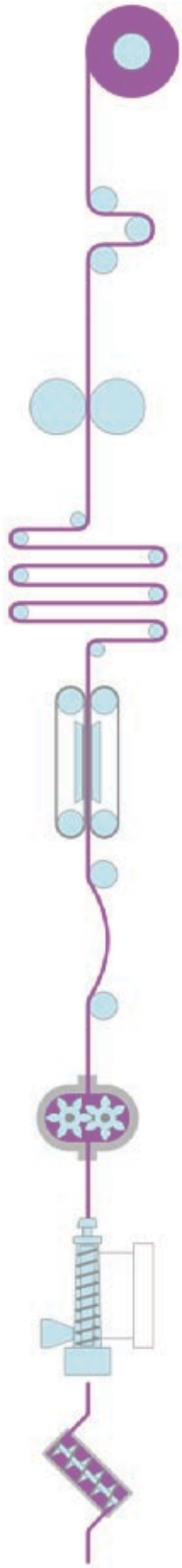
Also run ***savvyPanel*** on PCs or roam on iOS devices such as iPad, iPhone

***drive.web smart automation***

- powerful programmable control functions
- peer-to-peer over Ethernet
- smart iPad or touch screen PC operation
- Easy system wide Internet access

## P2 Specifications

| | | |
|---|---|---|
| Input Ratings | Supply Voltage | 200 - 240 ± 10%<br>380 - 480 ± 10% |
| | Supply Frequency | 48 - 62 Hz |
| | Displacement PF | > 0.98 |
| | Phase Imbalance | 3% Maximum allowed |
| | Inrush Current | < Rated current |
| | Power Cycles | 120 per hour max, evenly spaced |
| Output Ratings | Power Output | 230V, 1-ph in: 1-3 HP (0.75-2.2 kW)<br>230V, 3-ph in: 1-120 HP (0.75-90 kW)<br>400V, 3-ph in: 0.75-160kW<br>460V, 3-ph in: 1-350 HP |
| | Overload Capacity | 150% for 60 secs, 200% for 4 secs. |
| | Output Frequency | 0-500Hz in V/Hz mode (0.1 Hz res) (optional 2KHz)<br>0-100Hz in vector made |
| Ambient Ratings | Temperature | Storage: -40°C to 60°C<br>Operating: -10°C to 40°C (IP40, IP55 & IP66)<br>-10°C to 50°C (IP20) |
| | Altitude | Up to 1000m ASL without de-rating<br>Up to 2000m Max UL Approved<br>Up to 4000m Max (non UL)<br>Above 1000m, de-rate 1% per 100m |
| | Humidity | 95% non-condensing |
| Enclosures | Ingress Protection | IP20 - Frame sizes 2 & 3<br>IP40 (NEMA 1) - Frame size 8<br>IP55 (NEMA 12) - Frame sizes 4 to 7<br>IP66 (NEMA 4X) - Optional sizes 2 & 3 |
| Programming | Keypad | Standard: built in keypad<br>Optional: Remote keypad<br>Optistick memory stick<br>***drive.web savvy*** software |
| | Display | Bright red LED (sizes 2 & 3)<br>Bright Green OLED text (sizes 4 to 7) |
| Control | Control Modes | Closed Loop (encoder) speed control<br>Closed Loop (encoder) torque control<br>Open Loop PM vector control<br>Sensorless vector speed control<br>V/F Voltage vector<br>Energy optimized V/F |
| | Modulation | 4 - 32 kHz effective |
| | Stop Mode | Ramp to stop - adjustable 0.1-600 secs<br>Safe Torque Off mode |
| | Braking | Motor flux braking (DC injection)<br>Built in brake transistor |
| | Skip Frequency | Single point user adjustable |
| | Analog Setpoint Control | 0-10v, 10-0v, ±10v<br>0-20mA, 20-0mA, 4-20mA, 20-4mA |
| | Digital Setpoint Control | Keypad<br>ModbusRTU<br>CANopen |
| | Automation | Optional ***drive.web*** Ethernet distributed control + programmable control, extra i/o, operator stations |
| | Communications Options | ***drive.web***, ModbusTCP, EIP, DeviceNet, Profibus |
| I/O Specification | Power Supply | 24VDC, 100mA short protected<br>10VDC, 5mA for setpoint potentiometer |
| | Programmable Inputs | 3 x Digital 10 to 30 VDC, response <4ms<br>2 x Analog/digital |
| | Programmable outputs | 2 x Analog, 0-10V, 0-20mA, 4-20mA<br>2 x Relay NO, 6A @ 250VAC, 5A @ 30VDC |
| Control & Monitoring | PID | Internal PID with feedback display |
| | Fault Memory | Last 4 trips stored with time stamp |
| | Data Logging | Current, temperature, DC Bus volts prior to trip |
| | Maintenance Indicator | Service life monitor with user adjustable interval |
| | Monitoring | Hours run<br>Resettable and non-resettable kWh meters |



## P2 Series Models & Ratings

### Standard IP20 Packages
With EMC Filter & DB transistor

200-240V ± 10%, 1-ph in, 230V, 3-ph motor

| Model | HP | Amps | Size |
|---|---|---|---|
| ODP2-22010-1HF42 | 1 | 4.3 | 2 |
| ODP2-22020-1HF42 | 2 | 7 | 2 |
| ODP2-22030-1HF42 | 3 | 10.5 | 2 |

200-240V ± 10%, 3-ph in, 230V, 3-ph motor

| Model | HP | Amps | Size |
|---|---|---|---|
| ODP2-22010-3HF42 | 1 | 4.3 | 2 |
| ODP2-22020-3HF42 | 2 | 7 | 2 |
| ODP2-22030-3HF42 | 3 | 10.5 | 2 |
| ODP2-32050-3HF42 | 5 | 18 | 3 |
| ODP2-32075-3HF42 | 7.5 | 24 | 3 |

380-480V ± 10%, 3-ph in, 460V, 3-ph motor

| Model | HP | Amps | Size |
|---|---|---|---|
| ODP2-24010-3HF42 | 1 | 2.2 | 2 |
| ODP2-24020-3HF42 | 2 | 4.1 | 2 |
| ODP2-24030-3HF42 | 3 | 5.8 | 2 |
| ODP2-24050-3HF42 | 5 | 9.5 | 2 |
| ODP2-34075-3HF42 | 7.5 | 14 | 3 |
| ODP2-34100-3HF42 | 10 | 18 | 3 |
| ODP2-34150-3HF42 | 15 | 24 | 3 |

### NEMA12 (IP55) Packages
With EMC Filter, DB transistor, DC Chokes

200-240V ± 10%, 3-ph in, 230V, 3-ph motor

| Model | HP | Amps | Size |
|---|---|---|---|
| ODP2-42075-3HF4N | 7.5 | 24 | 4 |
| ODP2-42100-3HF4N | 10 | 30 | 4 |
| ODP2-42150-3HF4N | 15 | 46 | 4 |
| ODP2-52020-3HF4N | 20 | 61 | 5 |
| ODP2-52025-3HF4N | 25 | 72 | 5 |
| ODP2-62030-3HF4N | 30 | 90 | 6 |
| ODP2-62040-3HF4N | 40 | 110 | 6 |
| ODP2-62050-3HF4N | 50 | 150 | 6 |
| ODP2-62060-3HF4N | 60 | 180 | 6 |
| ODP2-72075-3HF4N | 75 | 202 | 7 |
| ODP2-72100-3HF4N | 100 | 248 | 7 |

380-480V ± 10%, 3-ph in, 460V, 3-ph motor

| Model | HP | Amps | Size |
|---|---|---|---|
| ODP2-44150-3HF4N | 15 | 24 | 4 |
| ODP2-44200-3HF4N | 20 | 30 | 4 |
| ODP2-44250-3HF4N | 25 | 39 | 4 |
| ODP2-44300-3HF4N | 30 | 46 | 4 |
| ODP2-54040-3HF4N | 40 | 61 | 5 |
| ODP2-54050-3HF4N | 50 | 72 | 5 |
| ODP2-64060-3HF4N | 60 | 90 | 6 |
| ODP2-64075-3HF4N | 75 | 110 | 6 |
| ODP2-64120-3HF4N | 120 | 150 | 6 |
| ODP2-64150-3HF4N | 150 | 180 | 6 |
| ODP2-74175-3HF4N | 175 | 202 | 7 |
| ODP2-74200-3HF4N | 200 | 240 | 7 |
| ODP2-74250-3HF4N | 250 | 302 | 7 |

### NEMA 1 (IP20) units to 400HP

| | | | |
|---|---|---|---|
| ODP2-84300-3H042 | 300 | 370 | NEMA 1 |
| ODP2-84400-3H042 | 400 | 480 | NEMA 1 |

For single phase supply derate to 50%

## P2 Series 600 Volts Drives

# 600VAC DRIVES

### Standard IP20 Packages to 20 HP
500-600V ± 10%, 3-ph in, 500-600V, 3-ph motor

| Model | HP | Amps | Size |
|---|---|---|---|
| ODP2-26010-3H042 | 1 | 2.1 | 2 |
| ODP2-26020-3H042 | 2 | 3.1 | 2 |
| ODP2-26030-3H042 | 3 | 4.1 | 2 |
| ODP2-26050-3H042 | 5 | 6.5 | 2 |
| ODP2-26075-3H042 | 7.5 | 9 | 2 |
| ODP2-36100-3H042 | 10 | 12 | 3 |
| ODP2-36150-3H042 | 15 | 17 | 3 |
| ODP2-36200-3H042 | 20 | 22 | 3 |

### NEMA 4X (IP66) Packages to 15 HP
SWITCHED - with keypad, display, speed pot
power isolator switch, FWD/OFF/REV switch
500-600V ± 10%, 3-ph in, 500-600V, 3-ph motor

| Model | HP | Amps | Size |
|---|---|---|---|
| ODP2-26010-3H04Y | 1 | 2.1 | 2 |
| ODP2-26020-3H04Y | 2 | 3.1 | 2 |
| ODP2-26030-3H04Y | 3 | 4.1 | 2 |
| ODP2-26050-3H04Y | 5 | 6.5 | 2 |
| ODP2-26075-3H04Y | 7.5 | 9 | 2 |
| ODP2-36100-3H04Y | 10 | 12 | 3 |
| ODP2-36150-3H04Y | 15 | 17 | 3 |

UNSWITCHED - with keypad & display
500-600V ± 10%, 3-ph in, 500-600V, 3-ph motor

| Model | HP | Amps | Size |
|---|---|---|---|
| ODP2-26010-3H04X | 1 | 2.1 | 2 |
| ODP2-26020-3H04X | 2 | 3.1 | 2 |
| ODP2-26030-3H04X | 3 | 4.1 | 2 |
| ODP2-26050-3H04X | 5 | 6.5 | 2 |
| ODP2-26075-3H04X | 7.5 | 9 | 2 |
| ODP2-36100-3H04X | 10 | 12 | 3 |
| ODP2-36150-3H04X | 15 | 17 | 3 |

### NEMA12 (IP55) Packages to 250 HP
500-600V ± 10%, 3-ph in, 500-600V, 3-ph motor

| Model | HP | Amps | Size |
|---|---|---|---|
| ODP2-46200-3H04N | 20 | 22 | 4 |
| ODP2-46250-3H04N | 25 | 28 | 4 |
| ODP2-46300-3H04N | 30 | 34 | 4 |
| ODP2-46400-3H04N | 40 | 43 | 4 |
| ODP2-56050-3H04N | 50 | 54 | 5 |
| ODP2-56060-3H04N | 60 | 65 | 5 |
| ODP2-66075-3H04N | 75 | 78 | 6 |
| ODP2-66100-3H04N | 100 | 105 | 6 |
| ODP2-66125-3H04N | 125 | 130 | 6 |
| ODP2-66150-3H04N | 150 | 150 | 6 |

### P2 OPTIONS
OPT2-ENCOD-IN Encoder feedback module
OPT2-OPORT-IN Remote keypad & display
OPT2-OPPAD-IN Remote keypad w/OLED display

| Dimensions<br>Size | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Height (ins) | 8.7" | 10.3" | 17.3" | 21.3" | 34.1" | 50.4" | 40" |
| Height (mm) | 221 | 261 | 440 | 540 | 865 | 1280 | 995 |
| Width (ins) | 4.4" | 5.2" | 6.8" | 9.3" | 13.0" | 13.0" | 19" |
| Width (mm) | 112 | 131 | 173 | 235 | 330 | 330 | 482 |
| Depth (ins) | 7.3" | 8.1" | 9.1" | 10.6" | 13.4" | 14.6" | 19" |
| Depth (mm) | 185 | 205 | 230 | 270 | 340 | 370 | 480 |

NEW!

# V3 Energy Efficient Drives

**Variable torque, fan & pump drive for:**

- HVAC
- Building systems
- Climate control
- Flow control

## Up to 60 HP at 460 Volts

**NEMA4X (IP66) to 15HP - 40°C (indoor) ***
**NEMA12 (IP55) 15 to 60HP - 40°C ***
*** Approvals: CE, C-Tick, (UL 2015)**

- Low input harmonic current distortion
- Compliant with EN61000-3-12
- >98% drive efficiency
- Low audible motor noise
- Internal EMC filter
- Smart energy optimization
- Resonance avoidance
- Sleep/wake functions
- Intelligent maintenance intervals
- 110% overload, 60 secs
- Motor flux braking
- ModbusRTU, BACnet
- OLED display

### Options

*drive.web* programmable control
Extended i/o
EIP, ModbusTCP, ProfibusDP, DeviceNet
Remote keypad
Power disconnect
*savvyPanel* touch screen HMI

## Motor compatibility:

- Induction motors
- PM AC motors
- Brushless DC motors
- Synchronous reluctance motors

## V3 Energy Efficient Drives

**380-480V ± 10%, 3-ph in, 460V, 3-ph motor**

| Model | HP | Amps | Size | NEMA |
|---|---|---|---|---|
| **NEMA 4X, with OLED text display & EMC Filter** | | | | |
| Unswitched | | | | |
| ODV3-340140-3F1X-TN | 7.5 | 14 | 3 | 4X |
| ODV3-340180-3F1X-TN | 10 | 18 | 3 | 4X |
| ODV3-340240-3F1X-TN | 15 | 24 | 3 | 4X |
| **w/Disconnect** | | | | |
| ODV3-340140-3F1D-TN | 7.5 | 14 | 3 | 4X |
| ODV3-340180-3F1D-TN | 10 | 18 | 3 | 4X |
| ODV3-340240-3F1D-TN | 15 | 24 | 3 | 4X |
| **NEMA 12, IP55 with OLED text display & EMC Filter** | | | | |
| ODV3-440300-3F1N-TN | 20 | 30 | 4 | 12 |
| ODV3-440390-3F1N-TN | 25 | 39 | 4 | 12 |
| ODV3-440460-3F1N-TN | 30 | 46 | 4 | 12 |
| ODV3-540610-3F1N-TN | 40 | 61 | 5 | 12 |
| ODV3-540720-3F1N-TN | 50 | 72 | 5 | 12 |
| ODV3-540900-3F1N-TN | 60 | 90 | 5 | 12 |

# V2 SERIES HVAC

## VARIABLE TORQUE FAN & PUMP DRIVES

## 0.5 TO 250 HP

- Fan & pump features
- NEMA 4X (IP66) to 10 HP
- NEMA 12 (IP55) to 250 HP
- BACnet & ModbusRTU

## FEATURES

Dedicated HVAC and centrifugal pump controller
Built in EMC filter standard
DC bus chokes built in, sizes 4 - 7
Multi-language, plain text OLED display for ease of use
Energy optimization for maximum efficiency
BACnet and ModbusRTU as standard
Built-in hours run and kWh meters
Built-in PID controller
Advanced application functions for easy programming
High frequency switching (up to 32kHz) for quiet running
Built-in sleep and wake functions for on demand use
Built-in motor flux braking
Programmable i/o
Optistick plug-in programming tool
Power loss ride through
40°C ambient
HVAC functions:
- Bi-directional Fire Mode for emergency ventilation

Pump functions:
- Blockage detection
- Adjustable cleaning cycle
- Multi-pump cascade control
- Pump stir mode

Standards - UL, CE, C-Tick on all models

Options:
***drive.web savvy*** smart programmable automation
***savvyPanel*** graphical, touch screen operator technology
Easy, off site Internet access to the complete system
Ethernet peer to peer networking
Ethernet ModbusTCP and EIP
3 additional relay outputs for cascade control
Additional ***smarty*** i/o option
Built in power isolator switch sizes 2 & 3

## Specifications

| | | |
|---|---|---|
| Input Ratings | Supply Voltage | 200 - 240 ± 10%<br>380 - 480 ± 10% |
| | Supply Frequency | 48 - 62 Hz |
| | Displacement PF | > 0.98 |
| | Phase Imbalance | 3% Maximum allowed |
| | Inrush Current | < Rated current |
| | Power Cycles | 120 per hour max, evenly spaced |
| Output Ratings | Power Output | 230V, 1-ph in: 1-3 HP (0.75-2.2 kW)<br>230V, 3-ph in: 1-120 HP (0.75-90 kW)<br>400V, 3-ph in: 0.75-160kW<br>460V, 3-ph in: 1-250 HP |
| | Overload Capacity | 110% for 60 secs, 125% for 2 secs. |
| | Output Frequency | 0-120Hz, 0.1 Hz resolution |
| Ambient Ratings | Temperature | Storage: -40°C to 60°C<br>Operating: -10°C to 40°C |
| | Altitude | Up to 1000m ASL without de-rating<br>Up to 2000m Max UL Approved<br>Up to 4000m Max (non UL)<br>Above 1000m, de-rate 1% per 100m |
| | Humidity | 95% non-condensing |
| Enclosures | Ingress Protection | NEMA4X (indoor) sizes 2, 3; NEMA12 sizes 4 to 7 |
| Programming | Keypad | Standard: built in keypad<br>Optional: Remote keypad<br>Optistick memory stick<br>***drive.web savvy*** software |
| | Display | Standard: Bright Green OLED |
| Control | Control Modes | Variable torque V/F<br>Variable torque Energy optimized V/F |
| | Modulation | 4 - 32 kHz effective |
| | Stop Mode | Ramp to stop - adjustable 0.1-600 secs<br>Coast to stop |
| | Braking | Motor flux braking (DC injection) |
| | Skip Frequency | Single point user adjustable |
| | Analog Setpoint Control | 0-10v, 10-0v, ±10v<br>0-20mA, 20-0mA, 4-20mA, 20-4mA |
| | Digital Setpoint Control | Keypad<br>ModbusRTU<br>BACnet |
| | Automation | Optional ***drive.web*** Ethernet distributed control + programmable control, extra i/o, operator stations |
| | Communications Options | ***drive.web***, ModbusTCP, EIP, DeviceNet, Profibus |
| I/O Specification | Power Supply | 24VDC, 100mA short protected<br>10VDC, 5mA for setpoint potentiometer |
| | Programmable Inputs | 3 x Digital 10 to 30 VDC, response <4ms<br>2 x Analog/digital |
| | Programmable outputs | 2 x Analog, 0-10V, 0-20mA, 4-20mA<br>2 x Relay NO, 6A @ 250VAC, 5A @ 30VDC |
| Control & Monitoring | PID | Internal PID with feedback display |
| | Fault Memory | Last 4 trips stored with time stamp |
| | Data Logging | Current, temperature, DC Bus volts prior to trip |
| | Maintenance Indicator | Service life monitor with user adjustable interval |
| | Monitoring | Hours run<br>Resettable and non-resettable kWh meters |
| Application functions | HVAC Functions | Fire mode for emergency ventilation |
| | Pump functions | Pump blockage detection<br>Pump cleaning cycles<br>Multi-pump cascade control<br>Pump stir mode |

# Models & Ratings

### 200-240V ± 10%, 1-ph in, 230V, 3-ph motor

| Model | HP | Amps | Size | NEMA |
|---|---|---|---|---|
| size 2 with LED display & EMC Filter: | | | | |
| ODV2-22010-1HF12-SN | 1 | 4.3 | 2 | IP20 |
| ODV2-22020-1HF12-SN | 2 | 7 | 2 | IP20 |
| ODV2-22030-1HF12-SN | 3 | 10.5 | 2 | IP20 |
| size 2 with OLED text display & EMC Filter: | | | | |
| ODV2-22010-1HF1X or D | 1 | 4.3 | 2 | 4X |
| ODV2-22020-1HF1X or D | 2 | 7 | 2 | 4X |
| ODV2-22030-1HF1X or D | 3 | 10.5 | 2 | 4X |

### 200-240V ± 10%, 3-ph in, 230V, 3-ph motor

| Model | HP | Amps | Size | NEMA |
|---|---|---|---|---|
| sizes 2 & 3 with LED display & EMC Filter: | | | | |
| ODV2-22010-3HF12-SN | 1 | 4.3 | 2 | IP20 |
| ODV2-22020-3HF12-SN | 2 | 7 | 2 | IP20 |
| ODV2-22030-3HF12-SN | 3 | 10.5 | 2 | IP20 |
| ODV2-32050-3HF12-SN | 5 | 18 | 3 | IP20 |
| ODV2-32075-3HF12-SN | 7.5 | 24 | 3 | IP20 |
| sizes 2 & 3 with OLED text display & EMC Filter: | | | | |
| ODV2-22010-3HF1X or D | 1 | 4.3 | 2 | 4X |
| ODV2-22020-3HF1X or D | 2 | 7 | 2 | 4X |
| ODV2-22030-3HF1X or D | 3 | 10.5 | 2 | 4X |
| ODV2-32050-3HF1X or D | 5 | 18 | 3 | 4X |
| sizes 4-7 - OLED text display, EMC filter & DC choke: | | | | |
| ODV2-42075-3HF1N | 7.5 | 24 | 4 | 12 |
| ODV2-42100-3HF1N | 10 | 30 | 4 | 12 |
| ODV2-42150-3HF1N | 15 | 46 | 4 | 12 |
| ODV2-52020-3HF1N | 20 | 61 | 5 | 12 |
| ODV2-52025-3HF1N | 25 | 72 | 5 | 12 |
| ODV2-52030-3HF1N | 30 | 90 | 5 | 12 |
| ODV2-62040-3HF1N | 40 | 110 | 6 | 12 |
| ODV2-62050-3HF1N | 50 | 150 | 6 | 12 |
| ODV2-62060-3HF1N | 60 | 180 | 6 | 12 |
| ODV2-62075-3HF1N | 75 | 202 | 6 | 12 |
| ODV2-72100-3HF1N | 100 | 248 | 7 | 12 |

### 380-480V ± 10%, 3-ph in, 460V, 3-ph motor

| Model | HP | Amps | Size | NEMA |
|---|---|---|---|---|
| sizes 2 & 3 with LED display & EMC Filter: | | | | |
| ODV2-24010-3HF12-SN | 1 | 2.2 | 2 | IP20 |
| ODV2-24020-3HF12-SN | 2 | 4.1 | 2 | IP20 |
| ODV2-24030-3HF12-SN | 3 | 5.8 | 2 | IP20 |
| ODV2-24050-3HF12-SN | 5 | 9.5 | 2 | IP20 |
| ODV2-34075-3HF12-SN | 7.5 | 14 | 3 | IP20 |
| ODV2-34100-3HF12-SN | 10 | 18 | 3 | IP20 |
| ODV2-34150-3HF12-SN | 15 | 24 | 3 | IP20 |
| sizes 2 & 3 with EMC Filter: | | | | |
| ODV2-24010-3HF1X or D | 1 | 2.2 | 2 | 4X |
| ODV2-24020-3HF1X or D | 2 | 4.1 | 2 | 4X |
| ODV2-24030-3HF1X or D | 3 | 5.8 | 2 | 4X |
| ODV2-24050-3HF1X or D | 5 | 9.5 | 2 | 4X |
| ODV2-34075-3HF1X or D | 7.5 | 14 | 3 | 4X |
| ODV2-34100-3HF1X or D | 10 | 18 | 3 | 4X |
| sizes 4-7 with EMC filter & DC choke: | | | | |
| ODV2-44150-3HF1N | 15 | 24 | 4 | 12 |
| ODV2-44200-3HF1N | 20 | 30 | 4 | 12 |
| ODV2-44250-3HF1N | 25 | 39 | 4 | 12 |
| ODV2-44300-3HF1N | 30 | 46 | 4 | 12 |
| ODV2-54040-3HF1N | 40 | 61 | 5 | 12 |
| ODV2-54050-3HF1N | 50 | 72 | 5 | 12 |
| ODV2-54060-3HF1N | 60 | 90 | 5 | 12 |
| ODV2-64075-3HF1N | 75 | 110 | 6 | 12 |
| ODV2-64120-3HF1N | 120 | 150 | 6 | 12 |
| ODV2-64150-3HF1N | 150 | 180 | 6 | 12 |
| ODV2-64175-3HF1N | 175 | 202 | 6 | 12 |
| ODV2-74200-3HF1N | 200 | 240 | 7 | 12 |
| ODV2-74250-3HF1N | 250 | 302 | 7 | 12 |
| size 8 with EMC Filter | | | | |
| ODV2-84300-3HF12-TN | 300 | 370 | 8 | IP20 |
| ODV2-84400-3HF12-TN | 400 | 450 | 8 | IP20 |

### Dimensions

| Size | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| **IP20 Drives** | | | | | | | |
| Height (ins) | 8.7" | 10.3" | | | | | 40" |
| Height (mm) | 221 | 261 | | | | | 955 |
| Width (ins) | 4.4" | 5.2" | | | | | 19" |
| Width (mm) | 112 | 131 | | | | | 482 |
| Depth (ins) | 7.3" | 8.1" | | | | | 19" |
| Depth (mm) | 185 | 205 | | | | | 480 |
| **NEMA 4X (IP66) Drives** | | | | | | | |
| Height (ins) | 10.1" | 12.2" | | | | | |
| Height (mm) | 257 | 310 | | | | | |
| Width (ins) | 7.4" | 8.3" | | | | | |
| Width (mm) | 188 | 211 | | | | | |
| Depth (ins) | 9.4" | 10.1" | | | | | |
| Depth (mm) | 238 | 256 | | | | | |
| **NEMA 12 (IP55) Drives** | | | | | | | |
| Height (ins) | | | 17.3" | 21.3" | 34.1" | 50.4" | |
| Height (mm) | | | 440 | 540 | 865 | 1280 | |
| Width (ins) | | | 6.8" | 9.3" | 13.0" | 13.0" | |
| Width (mm) | | | 173 | 235 | 330 | 330 | |
| Depth (ins) | | | 9.1" | 10.6" | 13.4" | 14.6" | |
| Depth (mm) | | | 230 | 270 | 340 | 370 | |

**Size 2 & 3 drives model number suffix X or D**

X = no disconnect switch

D = with power disconnect switch

***speedy on board***
Ethernet networking
USB programming
smart automation

# 600 Volts Drives

### 500-600V ± 10%, 3-ph in 500-600V, 3-ph motor

| Model | HP | Amps | Size | NEMA |
|---|---|---|---|---|
| **IP20 with LED display** | | | | |
| ODV2-26010-3H012-SN | 1 | 2.1 | 2 | IP20 |
| ODV2-26020-3H012-SN | 2 | 3.1 | 2 | IP20 |
| ODV2-26030-3H012-SN | 3 | 4.1 | 2 | IP20 |
| ODV2-26050-3H012-SN | 5 | 6.5 | 2 | IP20 |
| ODV2-26075-3H012-SN | 7.5 | 9 | 2 | IP20 |
| ODV2-36100-3H012-SN | 10 | 12 | 3 | IP20 |
| ODV2-36150-3H012-SN | 15 | 17 | 3 | IP20 |
| ODV2-36200-3H012-SN | 20 | 22 | 3 | IP20 |
| **NEMA 4X (IP66), with OLED text display** | | | | |
| **Unswitched** | | | | |
| ODV2-26010-3H01X-TN | 1 | 2.1 | 2 | 4X |
| ODV2-26020-3H01X-TN | 2 | 3.1 | 2 | 4X |
| ODV2-26030-3H01X-TN | 3 | 4.1 | 2 | 4X |
| ODV2-26050-3H01X-TN | 5 | 6.5 | 2 | 4X |
| ODV2-36075-3H01X-TN | 7.5 | 9 | 3 | 4X |
| ODV2-36100-3H01X-TN | 10 | 12 | 3 | 4X |
| ODV2-36150-3H01X-TN | 15 | 17 | 3 | 4X |
| **w/Disconnect** | | | | |
| ODV2-26010-3H01D-TN | 1 | 2.1 | 2 | 4X |
| ODV2-26020-3H01D-TN | 2 | 3.1 | 2 | 4X |
| ODV2-26030-3H01D-TN | 3 | 4.1 | 2 | 4X |
| ODV2-26050-3H01D-TN | 5 | 6.5 | 2 | 4X |
| ODV2-36075-3H01D-TN | 7.5 | 9 | 3 | 4X |
| ODV2-36100-3H01D-TN | 10 | 12 | 3 | 4X |
| ODV2-36150-3H01D-TN | 15 | 17 | 3 | 4X |
| **NEMA 12 (IP55) with OLED text display, DC choke** | | | | |
| ODV2-46200-3H01N-TN | 20 | 22 | 4 | 12 |
| ODV2-46250-3H01N-TN | 25 | 28 | 4 | 12 |
| ODV2-46300-3H01N-TN | 30 | 34 | 4 | 12 |
| ODV2-46400-3H01N-TN | 40 | 43 | 4 | 12 |
| ODV2-56050-3H01N-TN | 50 | 54 | 5 | 12 |
| ODV2-56060-3H01N-TN | 60 | 65 | 5 | 12 |
| ODV2-66075-3H01N-TN | 75 | 78 | 6 | 12 |
| ODV2-66100-3H01N-TN | 100 | 105 | 6 | 12 |
| ODV2-66125-3H01N-TN | 125 | 130 | 6 | 12 |
| ODV2-66150-3H01N-TN | 150 | 150 | 6 | 12 |

# OPTIDRIVE E2

General purpose drives with all purpose features
Up to 15 HP
Basic or NEMA 4X (IP66)
Basic or full featured systems drive
3-Phase & single phase motor versions

Basic or loaded, the new E2 is designed to give you the very best in value, performance and ease of use. The innovative design incorporates flexibility, expandability and convenience that will work in many different applications throughout your plant.

**NEMA 4X versions see Page 40**

## Expandable
## Economical
## Easy
## Enduring
## Efficient

OPTISTICK
Plug-in upload/download
configuration memory stick

***speedy***
Programmable control
& Ethernet networking

OPT2-OPORT-IN
Remote keypad/display

***savvyPanel touch***
7" touch screen
Auto-connects to all drives
& devices on your LAN

**KEY FEATURES**

- Compact packaging
- Simple mechanical and electrical installation
- 50°C ambient rating
- 150% rating for 60 seconds, 175% for 2 seconds
- Simple 14 parameter basic set up
- Integral RFI filter option
- Integral brake transistor, sizes 2 & 3 (100% continuous rated)
- ModbusRTU serial port

**Options:**

- Remote keypad and display
- OPTISTICK plug in unit for fast up/down load of parameters
- ***smarty*** remote i/o, programmable control & Ethernet networking
- ***speedy*** programmable control & Ethernet networking
- ***savvyPanel*** smart touch screen operator station technology

**Standards:**

UL, C-UL, CE, C-Tick

## SPECIFICATION

| | | |
|---|---|---|
| Output | Frequency | 0 to 500Hz |
| Supply options | Frequency | 48 - 62 Hz |
| | Voltage/Phases | 100 - 132 volts max, single phase (0.5 - 1.5HP)<br>180 - 264 volts max, 1-phase (0.5 - 3HP)<br>180 - 264 volts max, 3-phase (0.5 - 5HP)<br>342 - 528 volts max, 3-phase (1 - 15HP) |
| Environment | Temperature | Operating, -10 to 50°C max, storage, -40 to 60°C |
| | Altitude | 0-2000M, derate 1% per 100M above 1000M |
| | Humidity | up to 95%, non condensing |
| | Ingress Protection | Basic IP20, Optional IP66 (NEMA 4X indoor rated) |
| Control | Mode | Voltage vector |
| | PWM frequency | 4 to 32KHz (effective) |
| | V/Hz ratio | Linear |
| | Boost | Yes |
| | Stop modes | Coast / ramp / DC brake |
| | Skip frequency | One point, adjustable frequency band |
| | Setpoint reference | 0-10VDC, 4-20mA, 20-4mA, 0-20mA, Keypad, Modbus |
| | Preset speeds | 8 |
| | PI control | Direct & analog input trim |
| | Spin start | Starts safely into rotating motor |
| | Accel/Decel | 0 - 600 seconds + Ramp stop decel 0 - 600 seconds |
| Configurable i/o | Input 1 | Programmable digital input |
| | Input 2 | Programmable digital input |
| | Input 3 | Configurable analog or digital input |
| | Input 4 | Configurable analog or digital input |
| | Output 1 | Configurable analog or digital output |
| | Output 2 | Normally open relay contact 30VDC 5A, 250VAC 6A |
| Protection | Drive trip | Over/under volts, over current, external trip, |
| | Motor | Overload, over temperature, short circuit, ground fault |
| | Trip memory | Last 4 trips stored |

Cost effective either stand alone or networked in coordinated systems

## MODEL NUMBERING

ODE2-12010-1H012 - 01

- Product Series
- Generation
- Frame Size 1 - 3
- Input Volts: 1=115VAC, 2=230VAC, 4=460VAC
- Power Rating
- Number of phases
- Power: H= HP, K= KW
- Filter Type: A= EMC filter on 460V drives, B= EMC filter on 230V drives, 0= No filter
- Brake Transistor 1= No Brake, 4= Brake
- IP rating: 2=IP20, N=NEMA12/IP55, unswitched, S=NEMA12/IP55, switched
- Suffix for single phase motor only

***drive.web***
***smart automation***

- powerful programmable control functions
- peer-to-peer over Ethernet
- smart iPad or touch screen PC operation
- Internet access

***savvyPanel*** operator station technology runs on iPad, iPhone or touch screen PC

## STANDARD IP20 DRIVES

| Model | Supply | Motor | Power | Amps | Size |
|---|---|---|---|---|---|
| ODE2-11005-1H012 | 1Ø, 115V | 3Ø, 230V | 0.5HP | 2.3 | 1 |
| ODE2-11010-1H012 | 1Ø, 115V | 3Ø, 230V | 1.0HP | 4.3 | 1 |
| ODE2-21015-1H042 | 1Ø, 115V | 3Ø, 230V | 1.5HP | 5.8 | 2 |
| ODE2-12005-1H012 | 1Ø, 230V | 3Ø, 230V | 0.5HP | 2.3 | 1 |
| ODE2-12010-1H012 | 1Ø, 230V | 3Ø, 230V | 1HP | 4.3 | 1 |
| ODE2-12020-1H012 | 1Ø, 230V | 3Ø, 230V | 2HP | 7 | 1 |
| ODE2-22020-1H042 | 1Ø, 230V | 3Ø, 230V | 2HP | 7 | 2 |
| ODE2-22030-1H042 | 1Ø, 230V | 3Ø, 230V | 3HP | 10.5 | 2 |
| ODE2-12005-3H012 | 3Ø, 230V | 3Ø, 230V | 0.5HP | 2.3 | 1 |
| ODE2-12010-3H012 | 3Ø, 230V | 3Ø, 230V | 1HP | 4.3 | 1 |
| ODE2-12020-3H012 | 3Ø, 230V | 3Ø, 230V | 2HP | 7 | 1 |
| ODE2-22020-3H042 | 3Ø, 230V | 3Ø, 230V | 2HP | 7 | 2 |
| ODE2-22030-3H042 | 3Ø, 230V | 3Ø, 230V | 3HP | 10.5 | 2 |
| *ODE2-32050-1H042 | 1Ø, 230V | 3Ø, 230V | 5HP | 18 | 3 |
| ODE2-32050-3H042 | 3Ø, 230V | 3Ø, 230V | 5HP | 18 | 3 |
| ODE2-14010-3H012 | 3Ø, 460V | 3Ø, 460V | 1HP | 2.2 | 1 |
| ODE2-14020-3H012 | 3Ø, 460V | 3Ø, 460V | 2HP | 4.1 | 1 |
| ODE2-24020-3H042 | 3Ø, 460V | 3Ø, 460V | 2HP | 4.1 | 2 |
| ODE2-24030-3H042 | 3Ø, 460V | 3Ø, 460V | 3HP | 5.8 | 2 |
| ODE2-24050-3H042 | 3Ø, 460V | 3Ø, 460V | 5HP | 9.5 | 2 |
| ODE2-34075-3H042 | 3Ø, 460V | 3Ø, 460V | 7.5HP | 14 | 3 |
| ODE2-34100-3H042 | 3Ø, 460V | 3Ø, 460V | 10HP | 18 | 3 |
| ODE2-34150-3H042 | 3Ø, 460V | 3Ø, 460V | 15HP | 24 | 3 |

* This unit not UL Listed

Models in blue are stocked in limited quantities
Please call +410-604-3400 for availability

**DIMENSIONS & WEIGHT**

| Size | Height | Width | Depth | Weight |
|---|---|---|---|---|
| 1 | 6.8" (173mm) | 3.3" (82mm) | 4.9" (123mm) | 2.5lbs (1.1kg) |
| 2 | 8.7" (221mm) | 4.1" (104mm) | 5.9" (150mm) | 5.9lbs (2.6kg) |
| 3 | 10.3" (261mm) | 5.2" (131mm) | 6.9" (175mm) | 9lbs (4.0kg) |

# NEMA 4X (IP66) Enclosed Drives

## For harsh, wet & dirty environments

**Switched** version with keypad, display, speed pot, forward/off/reverse switch & power isolator switch.

**Unswitched** version with keypad & display.

### Key Features

- 40°C ambient temperature
- Conduit cable entry
- Padlockable power switch
- ModbusRTU port
- ABS moldings & corrosion resistant heat sink
- All standard drive features included
- Brake standard on sizes 2 & 3
- Optional internal Ethernet size 2 & 3
- Can be used outdoors if protected from direct or reflected sunlight at all times.

### Standards

UL, C-UL, CE, C-Tick

### NEMA 4X (IP66) INDOOR RATED ODP2 OPEN/CLOSED LOOP VECTOR DRIVES

**With EMC filter, brake transistor +/- DC bus**

| SIZE | HP | AMPS | UNSWITCHED | SWITCHED |
|---|---|---|---|---|
| **230V, SINGLE PHASE IN, 230V, 3-PHASE MOTOR** | | | | |
| 2 | 1 | 4.3 | ODP2-22010-1HF4X | ODP2-22010-1HF4Y |
| 2 | 2 | 7 | ODP2-22020-1HF4X | ODP2-22020-1HF4Y |
| 2 | 3 | 10.5 | ODP2-22030-1HF4X | ODP2-22030-1HF4Y |
| **230V, 3-PHASE IN, 230V, 3-PHASE MOTOR** | | | | |
| 2 | 1 | 4.3 | ODP2-22010-3HF4X | ODP2-22010-3HF4Y |
| 2 | 2 | 7 | ODP2-22020-3HF4X | ODP2-22020-3HF4Y |
| 2 | 3 | 10.5 | ODP2-22030-3HF4X | ODP2-22030-3HF4Y |
| 3 | 5 | 18 | ODP2-32050-3HF4X | *ODP2-32050-3HF4Y |
| **380/460V, 3-PHASE IN, 380/460V, 3-PHASE MOTOR** | | | | |
| 2 | 1 | 2.2 | ODP2-24010-3HF4X | ODP2-14010-3HF4Y |
| 2 | 2 | 4.1 | ODP2-24020-3HF4X | ODP2-24020-3HF4Y |
| 2 | 3 | 5.8 | ODP2-24030-3HF4X | ODP2-24030-3HF4Y |
| 2 | 5 | 9.5 | ODP2-24050-3HF4X | ODP2-24050-3HF4Y |
| 3 | 7.5 | 14 | ODP2-34075-3HF4X | ODP2-34075-3HF4Y |
| 3 | 10 | 18 | ODP2-34100-3HF4X | ODP2-34100-3HF4Y |

Encoder feed back option OPT2-ENCOD-IN
Ethernet networking & basic programmable control option dw224-00
(for more smart control options see pages 18-21)

**DIMENSIONS & WEIGHT**

| Size | Height | Width | Depth | Weight |
|---|---|---|---|---|
| 2 | 10.1" (257mm) | 7.4" (188mm) | 9.4" (259mm) | 10.8lbs (4.8kg) |
| 3 | 12.2" (310mm) | 8.3" (211mm) | 9.9" (251mm) | 16.5lbs (7.5kg) |

### NEMA 4X (IP66) INDOOR RATED ODE2 SERIES GENERAL PURPOSE VFD

| SIZE | HP | AMPS | UNSWITCHED | SWITCHED |
|---|---|---|---|---|
| **115V, SINGLE PHASE IN, 230V, 3-PHASE MOTOR** | | | | |
| 1 | 0.5 | 2.3 | ODE2-11005-1H01X | ODE2-11005-1H01Y |
| 1 | 1.0 | 4.3 | ODE2-11010-1H01X | ODE2-11010-1H01Y |
| 2 | 1.5 | 5.8 | ODE2-21015-1H04X | ODE2-21015-1H04Y |
| **230V, SINGLE PHASE IN, 230V, 3-PHASE MOTOR** | | | | |
| 1 | 0.5 | 2.3 | ODE2-12005-1H01X | ODE2-12005-1H01Y |
| 1 | 1 | 4.3 | ODE2-12010-1H01X | ODE2-12010-1H01Y |
| 1 | 2 | 7 | ODE2-12020-1H01X | ODE2-12020-1H01Y |
| 2 | 2 | 7 | ODE2-22020-1H04X | ODE2-22020-1H04Y |
| 2 | 3 | 10.5 | ODE2-22030-1H04X | ODE2-22030-1H04Y |
| 3 | 5 | 15 | *ODE2-32050-1H04X | *ODE2-32050-3H04Y |
| | | | * This unit not UL Listed | |
| **230V, 3-PHASE IN, 230V, 3-PHASE MOTOR** | | | | |
| 3 | 5 | 15 | ODE2-32050-3H04X | ODE2-32050-3H04Y |
| **380/460V, 3-PHASE IN, 380/460V, 3-PHASE MOTOR** | | | | |
| 1 | 1 | 2.2 | ODE2-14010-3H01X | ODE2-14010-3H01Y |
| 1 | 2 | 4.1 | ODE2-14020-3H01X | ODE2-14020-3H01Y |
| 2 | 2 | 4.1 | ODE2-24020-3H04X | ODE2-24020-3H04Y |
| 2 | 3 | 5.8 | ODE2-24030-3H04X | ODE2-24030-3H04Y |
| 2 | 5 | 9.5 | ODE2-24050-3H04X | ODE2-24050-3H04Y |
| 3 | 7.5 | 14 | ODE2-34075-3H04X | ODE2-34075-3H04Y |
| 3 | 10 | 18 | ODE2-34100-3H04X | ODE2-34100-3H04Y |

Ethernet networking & basic programmable control option dw222-00

**DIMENSIONS & WEIGHT**

| Size | Height | Width | Depth | Weight |
|---|---|---|---|---|
| 1 | 9.1" (232mm) | 6.4" (161mm) | 6.9" (175mm) | 6.2lbs (2.8kg) |
| 2 | 10.1" (257mm) | 7.4" (188mm) | 7.4" (187mm) | 10.1lbs (4.6kg) |
| 3 | 12.2" (310mm) | 8.3" (211mm) | 9.6" (243mm) | 16.3lbs (7.4kg) |

# AC Drive Options

| ITEM | DESCRIPTION | MODEL P2 | V2 | E2 |
|---|---|---|---|---|
| **Touch Screen Programmable Operator Stations** | | | | |
| dw230+dw222 | 7" savvyPanel touch, programmable NEMA 4 diaplay | | | ✓ |
| dw230+dw224 | 7" savvyPanel touch, programmable NEMA 4 diaplay | ✓ | | |
| dw230+dw226 | 7" savvyPanel touch, programmable NEMA 4 diaplay | | ✓ | |
| **Remote Keypads** | | | | |
| OPT2-OPORT-IN | Remote Keypad | ✓ | ✓ | ✓ |
| OPT2-OPPAD-IN | Remote keypad with OLED display | ✓ | ✓ | ✓ |
| **Communications** | | | | |
| speedy dw21X-04 | ModbusTCP/IP Interface Module | ✓ | ✓ | ✓ |
| speedy dw21X-25 | EIP/PCCC Interface Module | ✓ | ✓ | ✓ |
| OPT2-DEVNT-IN | DeviceNet Interface Module | ✓ | ✓ | |
| OPT2-PFNET-IN | ProfiNET Interface Module | ✓ | ✓ | |
| OPT2-PROFB-IN | Profibus DP Interface Module | ✓ | ✓ | |
| OPT2-BNTIP-IN | Bacnet IP Interface Module | | ✓ | |
| OPT2-BNTSP-IN | Bacnet RJ45 connector | | ✓ | |
| **Programming Interface** | | | | |
| speedy dw21X | USB Interface Module | ✓ | ✓ | ✓ |
| OPT-STICK-IN | Optistick parameter copying stick with IR interface | | | ✓ |
| OPT2-STICK-IN | Optistick parameter copying stick with Bluetooth | ✓ | ✓ | ✓ |
| **Encoder Feedback** | | | | |
| OPT2-ENCOD-IN | Encoder feedback module for P2 | ✓ | | |
| **EMC Filters** | | | | |
| OPT2-E1010-20 | Optifilter, EMC input filter, 1-phase, 10A, IP20 | ✓ | ✓ | ✓ |
| OPT2-E1010-66 | Optifilter, EMC input filter, 1-phase, 10A, IP66 | ✓ | ✓ | ✓ |
| OPT2-E1025-20 | Optifilter, EMC input filter, 1-phase, 25A, IP20 | ✓ | ✓ | ✓ |
| OPT2-E1025-66 | Optifilter, EMC input filter, 1-phase, 25A, IP66 | ✓ | ✓ | ✓ |
| OPT2-E3006-20 | Optifilter, EMC input filter, 3-phase, 6A, IP20 | ✓ | ✓ | ✓ |
| OPT2-E3006-66 | Optifilter, EMC input filter, 3-phase, 6A, IP66 | ✓ | ✓ | ✓ |
| OPT2-E3016-20 | Optifilter, EMC input filter, 3-phase, 16A, IP20 | ✓ | ✓ | ✓ |
| OPT2-E3016-66 | Optifilter, EMC input filter, 3-phase, 16A, IP66 | ✓ | ✓ | ✓ |
| OPT2-E3025-20 | Optifilter, EMC input filter, 3-phase, 25A, IP20 | ✓ | ✓ | ✓ |
| OPT2-E3025-66 | Optifilter, EMC input filter, 3-phase, 25A, IP66 | ✓ | ✓ | ✓ |
| OPT2-E3050-20 | Optifilter, EMC input filter, 3-phase, 50A, IP20 | ✓ | ✓ | |
| OPT2-E3080-20 | Optifilter, EMC input filter, 3-phase, 80A, IP20 | ✓ | ✓ | |
| OPT2-E3180-20 | Optifilter, EMC input filter, 3-phase, 180A, IP20 | ✓ | ✓ | |
| OPT2-E3300-00 | Optifilter, EMC input filter, 3-phase, 300A, IP00 | ✓ | ✓ | |
| **Brake Resistors (Case Type)** | | | | |
| OD-BR100-IN | DB Resistor, drive size 2, 100Ω, 200W | | | ✓ |
| OD-BR050-IN-i55 | DB Resistor, drive size 2, IP55 50Ω, 200W | | | ✓ |
| **Brake Resistors (Enclosed, ventilated with over temp switch)** Intermittent duty 10%, 10 sec | | | | |
| CX503069 | 1 - 3 HP 230VAC, 63Ω, 12"x5"x5" | ✓ | | ✓ |
| CX503070 | 5 HP 230VAC, 38Ω, 12"x5"x5" | ✓ | | |
| CX503072 | 7.5 - 10 HP 230VAC, 19Ω, 12"x7"x5" | ✓ | | |
| CX503073 | 15 HP 230VAC, 12.6Ω, 12"x10"x5" | ✓ | | |
| CX503074 | 20 HP 230VAC, 9.6Ω, 12"x13"x5" | ✓ | | |
| CX503075 | 25 HP 230VAC, 7.5Ω, 12"x16"x5" | ✓ | | |
| CX503076 | 30 HP 230VAC, 6.3Ω, 19"x10"x5" | ✓ | | |
| CX503077 | 40 HP 230VAC, 4.9Ω, 19"x10"x5" | ✓ | | |
| CX503078 | 50 HP 230VAC, 3.9Ω, 19"x10"x5" | ✓ | | |
| CX503079 | 60 HP 230VAC, 3.3Ω, 19"x13"x5" | ✓ | | |
| CX503082 | 1 - 3 HP 460VAC, 250Ω, 12"x5"x5" | ✓ | | ✓ |
| CX503085 | 5 - 10 HP 460VAC, 75Ω, 12"x7"x5" | ✓ | | ✓ |
| CX503086 | 15 HP 460VAC, 50Ω, 12"x10"x5" | ✓ | | ✓ |
| CX503087 | 20 HP 460VAC, 38Ω, 12"x13"x5" | ✓ | | |
| CX503088 | 25 HP 460VAC, 30Ω, 12"x16"x5" | ✓ | | |
| CX503089 | 30 HP 460VAC, 25Ω, 19"x10"x5" | ✓ | | |
| CX503090 | 40 HP 460VAC, 19Ω, 19"x13"x5" | ✓ | | |
| CX503091 | 50 HP 460VAC, 15Ω, 19"x13"x5" | ✓ | | |
| CX503092 | 60 HP 460VAC, 12.6Ω, 19"x13"x5" | ✓ | | |
| CX503093 | 75 HP 460VAC, 10Ω, 26.5"x10"x5" | ✓ | | |
| CX503094 | 100 HP 460VAC, 7.5Ω, 26.5"x16"x5" | ✓ | | |
| CX503096 | 125 - 150 HP 460VAC, 6Ω, 28"x10"x10" | ✓ | | |
| **Output Filters** | | | | |
| OPT2-M3008-20 | Output filter, 8A, IP20 | ✓ | ✓ | ✓ |
| OPT2-M3008-66 | Output filter, 8A, IP66 | ✓ | ✓ | ✓ |
| OPT2-M3012-20 | Output filter, 12A, IP20 | ✓ | ✓ | ✓ |
| OPT2-M3012-66 | Output filter, 12A, IP66 | ✓ | ✓ | ✓ |
| OPT2-M3018-66 | Output filter, 18A, IP66 | ✓ | ✓ | ✓ |
| OPT2-M3030-20 | Output filter, 30A, IP20 | ✓ | ✓ | |
| OPT2-M3075-20 | Output filter, 75A, IP20 | ✓ | ✓ | |
| OPT2-M3180-00 | Output filter, 180A, IP00 | ✓ | ✓ | |
| OPT2-M3300-00 | Output filter, 300A, IP00 | ✓ | ✓ | |
| **Data Cables & Splitters** | | | | |
| OPT-J4505-IN | RS485 data cable, 0.5M, (RJ45 - RJ45) | ✓ | ✓ | ✓ |
| OPT-J4510-IN | RS485 data cable, 1M, (RJ45 - RJ45) | ✓ | ✓ | ✓ |
| OPT-J4530-IN | RS485 data cable, 3M, (RJ45 - RJ45) | ✓ | ✓ | ✓ |
| OPT-J45SP-IN | RS485 data cable 3-way splitter (RJ45) | ✓ | ✓ | ✓ |
| **i/o Boards** | | | | |
| OPT-LOGIP-11 | 110VAC logic input isolator | | | ✓ |
| OPT-LOGIP-23 | 230VAC logic input isolator | | | ✓ |
| OPT2-CASCD-IN | Cascade control plug in option board | ✓ | ✓ | |
| OPT-LOGIP-23 | 230VAC logic input isolator | ✓ | ✓ | |

# 3-Phase Line Reactors for AC Drives

460 volts, 3% impedance, open construction for mounting in a protected enclosure

| HP | Model | Amps | mH |
|---|---|---|---|
| 1 | LMAC341 | 2 | 12 |
| 2 | LMAC342 | 4 | 6.5 |
| 5 | LMAC345 | 8 | 3 |
| 7.5 | LMAC347.5 | 12 | 2.5 |
| 10 | LMAC3410 | 18 | 1.5 |
| 15 | LMAC3415 | 25 | 1.2 |
| 25 | LMAC3425 | 35 | 0.8 |
| 30 | LMAC3430 | 45 | 0.7 |
| 40 | LMAC3440 | 55 | 0.5 |
| 75 | LMAC3475 | 100 | 0.3 |
| 100 | LMAC34100 | 130 | 0.2 |
| 150 | LMAC34150 | 200 | 0.11 |
| 200 | LMAC34200 | 250 | 0.09 |
| 250 | LMAC34250 | 320 | 0.075 |
| 300 | LMAC34300 | 400 | 0.06 |
| 400 | LMAC34400 | 500 | 0.05 |

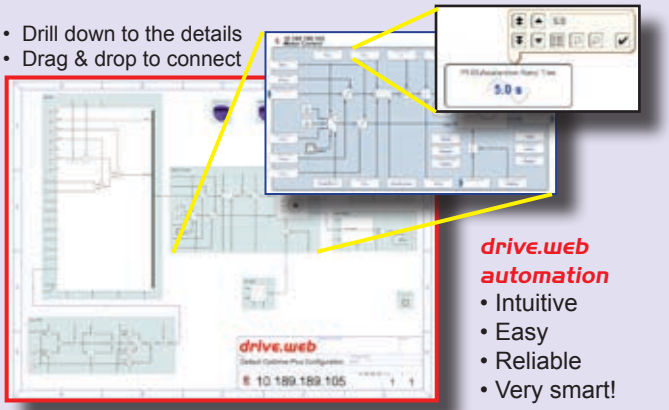
# drive.web smart drives

Add a ***drive.web*** Universal Automation Controller to any drive for unlimited automation capability (see pages 3-25):

- Powerful programmable control functions
- Peer-to-peer networking over Ethernet
- Smart iPad or touch screen PC operation
- Internet access
- Unlimited additional i/o

| ITEM | DESCRIPTION | MODEL P2 | V2 | E2 |
|---|---|---|---|---|
| **Smart Programmable Control + Peer-to-Peer Networking + Extra i/o** | | | | |
| dw212 | ***drive.web smarty*** interface for E2 models w/16 extra i/o | | | ✓ |
| dw214 | ***drive.web smarty*** interface for P2 models w/16 extra i/o | ✓ | | |
| dw216 | ***drive.web smarty*** interface for V2 models w/16 extra i/o | | ✓ | |
| -04 OPTION | ModbusTCP/IP | ✓ | ✓ | ✓ |
| -05 OPTION | Function Block Library 1, Process Control | ✓ | ✓ | ✓ |
| -06 OPTION | Function Block Library 2, Winder Control | ✓ | | ✓ |
| -10 OPTION | Function Block Library 3, Advanced Math | ✓ | ✓ | ✓ |
| -15 OPTION | Encoder input | ✓ | ✓ | ✓ |
| For additional options see page14 | | | | |
| **Smart Programmable Control + Peer-to-Peer Networking** | | | | |
| dw22X | ***drive.web speedy*** interface modules | ✓ | ✓ | ✓ |
| | With Ethernet ModbusTCP/IP & basic function blocks - see page 14 | | | |
| -05 OPTION | Function Block Library 1, Process Control | ✓ | ✓ | ✓ |
| -06 OPTION | Function Block Library 2, Winder Control | ✓ | | |
| -10 OPTION | Function Block Library 3, Advanced Math | ✓ | ✓ | ✓ |

- Drill down to the details
- Drag & drop to connect




***drive.web automation***

- Intuitive
- Easy
- Reliable
- Very smart!

# OPTIDRIVE E2 SINGLE PHASE

## Single Phase Motor Controller

For Shaded Pole (SP) & Permanent Split Capacitor (PSC) motors used in direct drive, variable torque, fan and pump type applications only

The innovative E2 Single Phase motor controller, uses a unique control algorithm that ensures reliable starting and control.

These drives are designed only for use on Shaded Pole (SP) or Permanent Split Capacitor (PSC) type motors in variable torque, direct drive fan and centrifugal pump applications.

They use high frequency switching to provide near silent running which is most desirable in applications such as:

- Commercial and residential HVAC
- Fume extraction
- Laboratories
- Quiet locations.

Like the other E2 products it is expandable, versatile and economical in all its forms:

Basic or NEMA4X (indoor rated) versions
Basic or full featured systems drive
Basic or peer-to-peer networking over Ethernet

**SPECIFICATION**

| | | |
|---|---|---|
| Output | Frequency | 0 to 120Hz |
| Supply options | Frequency | 48 - 62 Hz |
| | Volts/Phases | 100 - 132 volts max, single phase (0.5 - 1.0HP)<br>180 - 264 volts max, 1-phase (0.5 - 1.5HP)<br>180 - 264 volts max, 3-phase (0.5 - 1.5HP, special order) |
| Environment | Temperature | Operating, -10 to 50°C max, storage, -40 to 60°C |
| | Altitude | 0-2000M, derate 1% per 100M above 1000M |
| | Humidity | up to 95%, non condensing |
| | Ingress | Basic IP20<br>Optional IP65 (NEMA4X) indoor rated (can be used outdoors if protected from direct or reflected sunlight) |
| Control | Mode | V/F |
| | PWM Hz | 4 to 32KHz (effective) |
| | V/Hz ratio | Linear |
| | Boost | Automatic boost phase operation |
| | Stop modes | Coast / ramp / DC brake |
| | Setpoint ref | 0-10VDC, 4-20mA, 0-20mA, Keypad, Modbus |
| | Presets | 8 preset speeds |
| | PI control | Direct & analog input trim |
| | Accel/Decel | 0 - 600 secs + Ramp stop decel 0 - 600 secs |
| Configurable i/o | Input 1 | Programmable digital input |
| | Input/output 2 | Selectable digital input / output |
| | Input 3 | Configurable analog or digital input |
| | Input 4 | Configurable analog or digital input |
| | Output 1 | Configurable analog or digital output |
| | Relay 1 | Normally open relay contact 30VDC 5A, 250VAC 6A |
| Protection | Drive trip | Over/under volts, over current, external trip, |
| | Motor | Overload, over temp, short circuit, ground fault |
| | Trip memory | Last 4 trips stored |

**THE BASICS**

Compact packaging
Simple mechanical and electrical installation
50°C ambient rating
150% rating for 60 seconds, 175% for 2 seconds
Simple basic set up
Integral brake transistor (size 2, 100% rated)
ModbusRTU serial port
Remote keypad and display option
OPTISTICK plug-in for easy parameter up/down load
Standards: UL, C-UL, CE, C-Tick

# E2 Single Phase IP20

Single phase motor controller for use only with Shaded Pole (SP) or Permanent Split Capacitor (PSC) type motors on variable torque, direct drive fans and centrifugal pumps

smart options

speedy control

savvyPanel vision

## STANDARD E2 1Ø IP20 DRIVES

| Model | Supply | Motor | Power | Amps | Size |
|---|---|---|---|---|---|
| ODE2-11005-1H012-01 | 1Ø, 115V | 1Ø, 115V | 0.5HP | 7.0 | 1 |
| ODE2-21007-1H042-01 | 1Ø, 115V | 1Ø, 115V | 0.75HP | 10.5 | 2 |
| ODE2-12005-1H012-01 | 1Ø, 230V | 1Ø, 230V | 0.5HP | 4.3 | 1 |
| ODE2-12010-1H012-01 | 1Ø, 230V | 1Ø, 230V | 1HP | 7.0 | 1 |
| ODE2-22015-1H042-01 | 1Ø, 230V | 1Ø, 230V | 1.5HP | 10.5 | 2 |

**DIMENSIONS & WEIGHT**

| Size | Height | Width | Depth | Weight |
|---|---|---|---|---|
| 1 | 6.8" (173mm) | 3.3" (82mm) | 4.9" (123mm) | 2.5lbs (1.1kg) |
| 2 | 8.7" (221mm) | 4.1" (104mm) | 5.9" (150mm) | 5.9lbs (2.6kg) |

# E2 SINGLE PHASE, NEMA 4X (IP66)

Single phase motor controller for use only with Shaded Pole (SP) or Permanent Split Capacitor (PSC) type motors in variable torque, fan and centrifugal pump applications

**Switched** version with keypad, display, speed pot, forward/off switch & power isolator switch

**Unswitched** version with keypad & display

## For harsh, dirty indoor environments

- 40°C ambient temperature
- Conduit cable entry
- Padlockable power switch
- Wash down duty
- ModbusRTU port
- Compact packaging
- All standard drive features included
- Brake standard on 230V, size 2
- Optional internal Ethernet
- Optional internal *drive.web*

## NEMA 4X / IP66 DRIVES (indoor rated)

| Model | Supply | Motor | Power | Amps | Size |
|---|---|---|---|---|---|
| ODE2-11005-1H01#-01 | 1Ø, 115V | 1Ø, 115V | 0.5HP | 7.0 | 1 |
| ODE2-21007-1H04#-01 | 1Ø, 115V | 1Ø, 115V | 0.75HP | 10.5 | 2 |
| ODE2-12005-1H01#-01 | 1Ø, 230V | 1Ø, 230V | 0.5HP | 4.3 | 1 |
| ODE2-12010-1H01#-01 | 1Ø, 230V | 1Ø, 230V | 1HP | 7.0 | 1 |
| ODE2-22015-1H04#-01 | 1Ø, 230V | 1Ø, 230V | 1.5HP | 10.5 | 2 |

# X = Unswitched, Y = Switched

**DIMENSIONS & WEIGHT**

| Size | Height | Width | Depth | Weight |
|---|---|---|---|---|
| 1 | 9.1" (232mm) | 6.4" (161mm) | 6.9" (175mm) | 6.2lbs (2.8kg) |
| 2 | 10.1" (257mm) | 7.4" (188mm) | 7.4" (187mm) | 10.1lbs (4.6kg) |

# K-Series single phase DC drives - up to 2HP

## Regenerative & Non-regenerative

Enclosed, DIN rail mounting drives in elegant compact packages for both stand alone and systems applications.

**Standard features include:**

- Plug-in screw terminals
- Dual 115 & 230 volts, 50/60Hz supply
- Armature volts or tach feedback
- IP20 enclosure
- Output for ramps, speed demand, current demand
- Inputs for ramped speed, unramped speed, torque (current)
- Logic outputs for overload & trip
- Configurable level comparator & sign changer
- Standards: UL, C-UL, CE

| MODEL | RATING | FEATURES | TERMINALS | |
|---|---|---|---|---|
| **NON-ISOLATED** | | | | |
| **K340** | **Armature current 3.4 amps** | | | |
| | 1/4Hp 0.25kW @90Vdc | Max Speed | +10V | |
| | 1/2Hp 0.55kW @180Vdc | Min Speed | Min | |
| | Size 1.4"W x 4.2"H x 4.7"D | Up Ramp | Input + | |
| | | IR Comp | Common | |
| **K680** | **Armature current 6.8 amps** | I max | Run | |
| | 1/2Hp 0.55kW @90Vdc | AVF/Tach switch | Tach f/b | |
| | 1Hp 0.75kW @180Vdc | Speed range switch | | |
| | Size 1.8"W x 4.2"H x 4.7"D | AC voltage selector | | |
| | | Field 1Amp 0.9x ac supply | | |
| **K1220** | **Armature current 12.2 amps** | | | |
| | 1Hp 0.75kW @90Vdc | | | |
| | 2Hp 1.8kW @180Vdc | | | |
| | Size 1.8"W x 4.2"H x 4.7"D | | | |
| **ISOLATED** | | | | |
| **K340i** | **Armature current 3.4 amps** | | | |
| | 1/4Hp 0.25kW @90Vdc | Max Speed | +10V ref | LevelO/P |
| | 1/2Hp 0.55kW @180Vdc | Min Speed | Min speed | Level iI/P |
| | Size 2.4"W x 4.2"H x 4.7"D | Up Ramp | Input + | Overload |
| | | Down Ramp | Output +/- | Trip |
| **K680i** | **Armature current 6.8 amps** | Stability | Common | Ramp O/P |
| | 1/2Hp 0.55kW @90Vdc | I max | Input +/- | Demand O/P |
| | 1Hp 0.75kW @180Vdc | IR Comp | Pushbutton + | Speed O/P |
| | Size 2.8"W x 4.2"H x 4.7"D | AVF/Tach switch | Pushbutton - | Current O/P |
| | | Speed range switch | Run | + Speed I/P |
| **K1220i** | **Armature current 12.2 amps** | AC voltage selector | Common | Torque I/P |
| | 1Hp 0.75kW @90Vdc | Level comparator | Tach f/b | |
| | 2Hp 1.8kW @180Vdc | | | |
| | Size 2.8"W x 4.2"H x 4.7"D | | | |
| **4-QUADRANT, REGENERATIVE, REVERSING, ISOLATED** | | | | |
| **K340XRi** | **Armature current 3.4 amps** | | | |
| | 1/4Hp 0.25kW @90Vdc | Max Speed | +10V ref | LevelO/P |
| | 1/2Hp 0.55kW @180Vdc | Min Speed | Min speed | Level iI/P |
| | Size 2.4"W x 4.2"H x 4.7"D | Up Ramp | Input + | Overload |
| | | Down Ramp | Output +/- | Trip |
| **K680XRi** | **Armature current 6.8 amps** | Stability | Common | Ramp O/P |
| | 1/2Hp 0.55kW @90Vdc | I max | Input +/- | Demand O/P |
| | 1Hp 0.75kW @180Vdc | IR Comp | Pushbutton + | Speed O/P |
| | Size 2.8"W x 4.2"H x 4.7"D | AVF/Tach switch | Pushbutton - | Current O/P |
| | | Speed range switch | Run | + Speed I/P |
| **K1220XRi** | **Armature current 12.2 amps** | AC voltage selector | Common | Torque I/P |
| | 1Hp 0.75kW @90Vdc | Level comparator | Tach f/b | |
| | 2Hp 1.8kW @180Vdc | | | |
| | Size 2.8"W x 4.2"H x 4.7"D | | | |

**Optional** *drive.web smarty*

For complete process automation Model dw210-1107 uses discrete i/o interface to provide:

- Ethernet networking
- Internet access
- Powerful function blockprogramming
- ModbusRTU and ModbusTCP/IP
- Additional remote i/o
- Encoder feedback

(see page 20 for details)

**High Speed Fuse Kits - DIN Rail Mounting**

| | | |
|---|---|---|
| FLN-6.3 | Line fuse kit | K340 |
| FLL-6.3 | Line/line fuse kit | K340 |
| FLNR-6.3 | Line & arm fuse kit | K340XRi |
| FLLR-6.3 | Line/line & arm fuse kit | K340XRi |
| FLN-20 | Line fuse kit | all non-regen K |
| FLL-20 | Line/line fuse kit | all non-regen K |
| FLNR-20 | Line & arm fuse kit | all regen K |
| FLLR-20 | Line/line & arm fuse kit | all regen K |

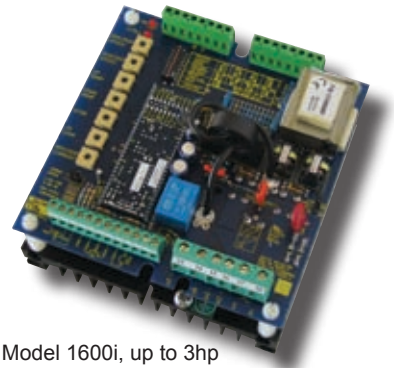
# Single Phase DC Systems Drives

This family of single phase DC drives with isolated control circuitry, is designed to meet the most exacting requirements of high performance systems builders. It is a range of full featured products using advanced manufacturing technologies to give unequaled value and functionality to OEMs and System Integrators with world wide markets and demanding applications.

| NON-REGEN MODELS | 230VAC, 180VDC | 115VAC, 90VDC | FUSE KIT |
|---|---|---|---|
| 400i (4 amps) | 0.75hp | 0.4hp | included |
| 1600i (16 amps) | 3hp | 1.5hp | F2-30 |
| 3200i/32 (32 amps) | 6hp | 3hp | F2-60 |
| | 415VAC, 320VDC | 240VAC, 180VDC | |
| 3200i/48LL (48 amps) | 7.5hp | 4hp | F2-80 |
| | 460VAC, 360VDC | 230VAC, 180VDC | |
| 3200i/32C109 (32 amps) | 8hp | 5hp | F2-60 |

| 4-Q REGEN, REVERSING MODELS | 230VAC, 180VDC | 115VAC, 90VDC | FUSE KIT |
|---|---|---|---|
| 3600XRi/16 | 3hp | 1.5hp | F3-30 |
| 3600XRi/32 | 6hp | 3hp | F3-60 |
| 3600XRi/36 | 6.5hp | 3hp | F3-60 |
| | 415VAC, 320VDC | 240VAC, 180VDC | |
| 3600XRi/36LL | 10hp | 6hp | F3-60 |
| | 480VAC, 360VDC | 240VAC, 180VDC | |
| 3600XRi/32C132 | 10hp | 6hp | F3-60 |

Model 400i, up to 0.75hp
4” x 6.25” x 2” (100 x 160 x 50mm)



Model 1600i, up to 3hp
6.1” x 6.1” x 3.4” (150 x 150 x 85 mm)

## Standard Features

Approvals: CE
Linear torque control
Armature voltage or tach feedback
Calibration range switches
Speed reference 0-10V or 4-20mA
Maximum and minimum speed settings
Adjustable current limit
Current range switch selectable (not on 400i)
Independently adjustable up and down ramps
150% overload capacity, 30 second stall timer
Stall relay contact output (transistor on 400i)
Zero speed relay contact (transistor on 400i)
Control fuses fitted (Power fuse on 400i)
Start inhibit after power loss
Power on and stall indicator LEDs
Speed signal output
Current signal output
Ramp signal output
Total demand signal output
Dual supply voltage 110 / 230 VAC, 50/60Hz
Suitable for shunt or PM motors
IR compensation
Stability adjustment

## Additional Regen Drive Features

Speed reference +/-10V or 4-20mA
Speed trim input
Independent up & down ramps in FWD & REV
Separate adjustable current limits motor/brake
Torque control in either 2 or 4 quadrants
Relay for Stall, Zero speed, Reverse, Overload
Control fuses fitted
Fast, ramped or coast stop
LEDs for + current, - current, stall & stall timer
Momentary contact for reversing applications

## Optional *drive.web smarty*

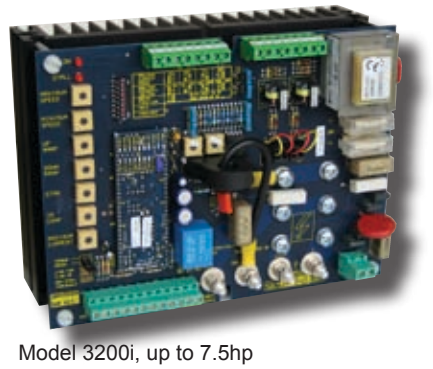
For complete process automation
Model dw210-1107 uses discrete i/o interface to the drive and to provide:

- Ethernet networking
- Internet access
- Powerful function blockprogramming
- ModbusRTU and ModbusTCP/IP
- Additional remote i/o
- Encoder feedback

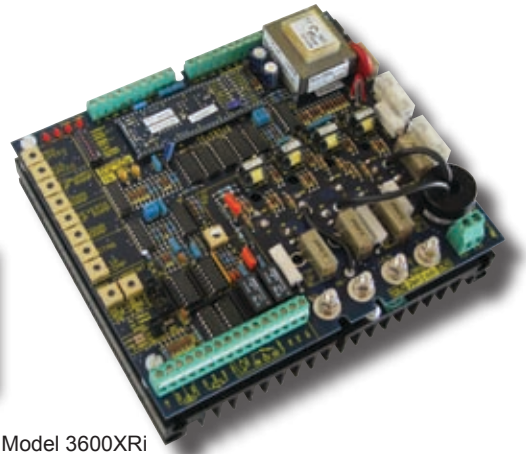
(see page 15 for details)

## Enclosed Drives

Enclosed wall mounting versions of these drives and a wide range of other options are detailed in the “Modulus Drive Units” section of this catalog



Model 3200i, up to 7.5hp
6.1” x 8.0” x 4.2” (150 x 200 x 105 mm)



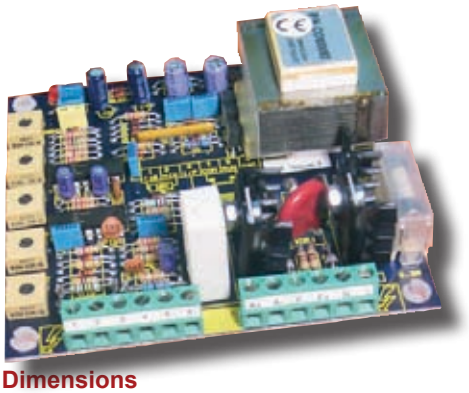
Model 3600XRi
Up to 32 amps - 6.9”x 8”x 3.2” (175x200x80 mm)
36 amps unit - 6.9”x 8”x 3.8” (175x200x95 mm)

# Single Phase DC Drives for OEMs

## Model 370 ... OEM Chassis Drives

Compact, DC drives designed for low cost, non-regenerative, non-isolated machine controls.

**Basic Specification:**
Rating: 1/4hp at 90VDC, 1/2hp at 180VDC
Maximum and minimum speed settings
Current limit
Acceleration pot
Suitable 110 or 230 volts, single phase, 50 or 60Hz (not isolated)
For use with permanent magnet or shunt field motors
Approval: CE



**Dimensions**
4" x 4" x 1.6" (100 x 100 x 40mm)

## Models 400, 800, 1200 ... OEM DC Drives (up to 2hp)

Versatile, basic, low cost drives suitable for wide range of machine control applications

| Model | Amps | Description | @ 180VDC | @ 90VDC | Dimensions |
|---|---|---|---|---|---|
| 400 | 4 amps | Open chassis with screw terminals | 0.75hp | 0.38hp | 5.2"x4.0"x1.6" (130x100x40mm) |
| 800 | 8 amps | Open chassis with screw terminals | 1.5hp | 0.75hp | 5.2"x4.0"x2.8" (130x100x70mm) |
| 1200 | 12 amps | Open chassis with screw terminals | 2.0hp | 1.0hp | 5.2"x4.0"x2.8" (130x100x70mm) |
| 400E | 4 amps | Enclosed NEMA 1 with pot, switch, fuse | 0.75hp | 0.38hp | 9.9"x7.0"x3.8" (250x177x95 mm |
| 800E | 8 amps | Enclosed NEMA 1 with pot, switch, fuse | 1.5hp | 0.75hp | 9.9"x7.0"x3.8" (250x177x95 mm |
| 1200E | 12 amps | Enclosed NEMA 1 with pot, switch, fuse | 2.0hp | 1.0hp | 9.9"x7.0"x3.8" (250x177x95 mm |
| 400ERB | 4 amps | Enclosed, pot, switch, brake, reverse, fuse | 0.75hp | 0.38hp | 9.9"x7.0"x3.8" (250x177x95 mm) |
| 800ERB | 8 amps | Enclosed, pot, switch, brake, reverse, fuse | 1.5hp | 0.75hp | 9.9"x7.0"x3.8" (250x177x95 mm) |
| 1200ERB | 12 amps | Enclosed, pot, switch, brake, reverse, fuse | 2.0hp | 1.0hp | 9.9"x7.0"x3.8" (250x177x95 mm) |

**Standard features:**
Linear torque control
Armature voltage or tach feedback with IR compensation
Calibration range switches (no component changes)
Speed reference 0-10V or 4-20mA
Maximum and minimum speed settings
Adjustable current limit
Independently adjustable up and down ramps
150% overload capacity with 30 second stall timer
Stall and Zero Speed relay driver outputs
Power fuse (up to 12 amps)
Power on and stall indicator LEDs
Stability adjustment
Speed, Ramp Speed and Current signal outputs
International supply voltages 110 / 230 VAC, 50/60hz (not isolated)
Suitable for shunt wound or permanent magnet motors

Approvals: CE

Model 1200E

# Linear Amplifier DC Servo Drives

These drives are designed for small, high performance position and speed control applications such as robotics, mechanical handling, automated assembly, packaging processes, machine tool axis, etc.

The units are miniature, fast response, reversing, linear transistor drives for brushed DC motors with armatures up to 48 volts. They operate from either a smoothed, unregulated, rectified DC, or battery supply, and include built in thermal protection, current limit with short term overcurrent capacity and resettable overload trip.

The control circuits are designed to ensure extremely low noise emissions, and will meet the most stringent of EMC (Electro-Magnetic Compliance) requirements.

## Model 200XLV 4-Quadrant DC Drive

Miniature unit with built in “P” or “P+I” or “PID” (Proportional, Integral, Derivative) for closed loop position, speed or torque control.

**Optional configurations:**

1. Speed control, armature voltage feedback with IR compensation.
2. Speed control, tach feedback.
3. Position control, position feedback.
4. Torque control with armature current feedback

### Specifications

| Model | Max Amps | Dimensions |
|---|---|---|
| 200XLV | 2 | 3.25” x 1.65” x 1.65” (82x40x40mm) |

## Models 400XLV, 800XLV & 1200XLV 4-Quadrant DC Drives

These products are designed for small, high performance position and speed control applications such as robotics, mechanical handling, automated assembly, packaging processes, machine tool axis, etc.

### Specifications

| Model | Max Amps | Dimensions |
|---|---|---|
| 400XLV | 2 | 4.2”h x 2.4”w x 4.75”d (106 x 61 x 120mm) |
| 800XLV | 8 | 4.2”h x 2.75”w x 4.75”d (106 x 70 x 120mm) |
| 1200XLV | 12 | 4.2”h x 2.75”w x 4.75”d (106 x 70 x 120mm) |

**Approvals: CE**

### Standard Features

Speed, or Torque control modes
Extremely low RF noise emissions
Ready indicator light
Motor voltage range: +/-6 VDC to +/-48 VDC
Armature current (see specifications below)
Supply voltage 12 to 48 VDC
Precision 5v and 10v references
Differential setpoint inputs (300K ohms)
Overload trip
Thermal protection
Adjustable Maximum Speed
Adjustable IR Compensation for armature volts f/b

Plug-in terminals

DIN rail mounting (optional on 200XLV)

# PL Series ...digital dc drives

## up to 2000+ hp

## Standard Features

- Total digital control
- Basic peer-to-peer link
- 40 character backlit display
- Friendly, easy menu structure
- Modern, compact packaging
- Extensive, flexible, plug-in i/o
- RS232 serial port
- Easy configuration saving & cloning
- Built-in automatic field controller
- Built in programmable control functions for PID, winders, orientation, etc.
- Tach, encoder & arm volts feedback
- Easy reliable autotune
- UL, C-UL, CE

## Optional:

- Peer-to-peer Ethernet communications
- ***drive.web*** programmable control
- ModbusTCP & EIP over Ethernet
- ModbusRTU RS485 serial port
- Devicenet
- Profibus DP

## *powerDRIVE* Packages

PL/X DC drives up to 400 horsepower are available in compact ***powerDRIVE*** packages complete with:

- Main contactor
- High speed 3-phase line fuses
- High speed armature fuse
- High speed control/field fuses
- Line filter (100HP & up)
- Optional motor blower starter (100HP & up)

# Key Features

**Analog Inputs & Outputs**
8 analog inputs & 4 analog outputs (12 bits)
All outputs short circuit protected
All inputs over voltage protected up to +50v
Inputs configurable 5 to 30v
Input volts programmable up to +/-30v

**Digital Inputs & Outputs**
17 digital inputs & 7 digital outputs
Digital i/o short circuit protected
Digital inputs over volts protected to +50v
(with settable switching levels)
Digital outputs over volts protected to +50v

**Speed Feedback - Standard**
Analog tach
Encoder
Armature voltage
Encoder + armature volts
Encoder + analog tach

**Field Configurations**
Fixed Current
Fixed voltage
Automatic field weakening
Delayed field quench
Standby field setting
Field economy

**Diagnostic Monitoring**
Scope terminal monitors selectable values
All analog input voltages
All digital input states
All analog output voltages
All digital output states
Tach volts
Motor arm volts & amps
Field current
Output power Kw
AC supply volts

**User Configurable Software Functions**
Two PID blocks, Parameter profiler, Winder reel diameter calculator, Winder taper tension calculator, Winder torque/inertia/ friction compensator, Preset speed function, Two summers, Software "motorized pot", Interval timer, Current profiling, Zero speed with shaft position lock, Jog / crawl functions, Two filters, Dual motor swap, Latch, Sample & hold function, Auto self-tune current loop, Linear and S-ramps, Slack take-up, Batch Counter, Draw control.

**Engineered Configuration Packages**
Using the drive.web speedy dw111 controller, pre-configured generic apps are available for Open & Closed Loop Winders, Position Controls, Coordinated Line Drives, Indexing and others.

**Protection**
Interline device networks
High energy MOV's
Instantaneous overcurrent
Overcurrent ( inverse time)
Field fail and overcurrent
Motor over temperature
SCR (thyristor) over temp
Main power phase loss
Armature over volts
Over speed protection
Speed feedback mismatch
Stall protection
Standstill logic
SCR (Thyristor) trigger failure
Digital output short circuit

**RS232 Serial Communications Port**
Parameter upload/download to save and print
Drive - to - drive parameter link & set up cloning

**Optional Communications**
*drive.web* peer-to-peer
Ethernet: *drive.web*, ModbusTCP/IP, EIP
ModbusRTU
Profibus DP

Easily add a *savvyPanel* touch screen HMI with secure WiFi interface

- Simple, intuitive configuration techniques with clear display of information
- No pots or switches to set
- Accurate display of voltages and currents
- Positive displacement pushbuttons for tactile feel
- High power processor and large memory will ensure ease of product enhancement in the future
- 2-button reset gets users back to OEM set up
- Powerful *savvy* graphical configuration, diagnostics & system design tools

The powerful *savvy* configuration tools are used for the PL Series DC drives, AC drives, *drive.web* programmable controllers, *savvyPanel* operator stations & complete systems.

# DC technology

↑ 75 HP, PLX50/123

**powerPLX50/123** →
With fuses, contactor & power components (shown hinged open for easy access)

↑ 400 HP, PL265/630

**powerPL265/630** →
With fuses, contactor & power components (shown with optional motor blower starter)

## Models & Ratings

### 4-Quadrant, Regenerative Drives

| hp @ 500V arm 460VAC | hp @ 240V arm 230VAC | Armature Amps DC @ 40°C | Field Amps DC power(basic) | *powerDRIVE* Model | Dimensions W x H x D (weight) inches (LBS) | *basicDRIVE* Model | Dimensions W x H x D (weight) inches (LBS) | Line Reactor Model |
|---|---|---|---|---|---|---|---|---|
| 20 | 10 | 36 | 5(8) | *power*PLX15/36 | 8.5 x 11.4 x 11.7 (26) | PLX15/36 | 8.5 x 11.4 x 6.9 (16) | LM37 |
| 30 | 10 | 51 | 5(8) | *power*PLX20/51 | 8.5 x 11.4 x 11.7 (26) | PLX20/51 | 8.5 x 11.4 x 6.9 (16) | LM52 |
| 60 | 25 | 99 | 5(8) | *power*PLX40/99 | 8.5 x 11.4 x 11.7 (30) | PLX40/99 | 8.5 x 11.4 x 6.9 (17) | LM120 |
| 75 | 35 | 123 | 5(8) | *power*PLX50/123 | 8.5 x 11.4 x 11.7 (30) | PLX50/123 | 8.5 x 11.4 x 6.9 (17) | LM120 |
| 100 | 50 | 164 | 10(16) | *power*PLX65/164 | 16 x 33 x 9.7 (80) | PLX65/164 | 8.5 x 16.2 x 8.6 (27) | LM150 |
| 125 | 60 | 205 | 10(16) | *power*PLX85/205 | 16 x 33 x 9.7 (80) | PLX85/205 | 8.5 x 16.2 x 8.6 (27) | LM195 |
| 150 | 75 | 270 | 10(16) | *power*PLX115/270 | 16 x 33 x 9.7 (82) | PLX115/270 | 8.5 x 16.2 x 8.6 (28) | LM240 |
| 200 | 100 | 330 | 10(16) | *power*PLX145/330 | 16 x 33 x 9.7 (89) | PLX145/330 | 8.5 x 16.2 x 8.6 (28) | LM300 |
| 250 | 125 | 405 | 20(32) | *power*PLX185/405 | 16 x 43.5 x 14.4(143) | PLX185/430 | 8.5 x 19.9 x 14.4 (43) | LM375 |
| 300 | 150 | 480 | 20(32) | *power*PLX225/480 | 16 x 43.5 x 14.4 (145) | PLX225/530 | 8.5 x 19.9 x 14.4 (45) | LM480 |

### 2-Quadrant, Non-Reversing Drives

| hp @ 500V arm 460VAC | hp @ 240V arm 230VAC | Armature Amps DC @ 40°C | Field Amps DC power(basic) | *powerDRIVE* Model | Dimensions W x H x D (weight) inches (LBS) | *basicDRIVE* Model | Dimensions W x H x D (weight) inches (LBS) | Line Reactor Model |
|---|---|---|---|---|---|---|---|---|
| 20 | 10 | 36 | 5(8) | *power*PL15/36 | 8.5 x 11.4 x 11.7 (26) | PL15/36 | 8.5 x 11.4 x 6.9 (16) | LM37 |
| 30 | 10 | 51 | 5(8) | *power*PL20/51 | 8.5 x 11.4 x 11.7 (26) | PL20/51 | 8.5 x 11.4 x 6.9 (16) | LM52 |
| 60 | 25 | 99 | 5(8) | *power*PL40/99 | 8.5 x 11.4 x 11.7 (30) | PL40/99 | 8.5 x 11.4 x 6.9 (17) | LM120 |
| 75 | 35 | 123 | 5(8) | *power*PL50/123 | 8.5 x 11.4 x 11.7 (30) | PL50/123 | 8.5 x 11.4 x 6.9 (17) | LM120 |
| 100 | 50 | 164 | 10(16) | *power*PL65/164 | 16 x 33 x 9.7 (80) | PL65/164 | 8.5 x 16.2 x 8.6 (27) | LM150 |
| 125 | 60 | 205 | 10(16) | *power*PL85/205 | 16 x 33 x 9.7 (80) | PL85/205 | 8.5 x 16.2 x 8.6 (27) | LM195 |
| 150 | 75 | 270 | 10(16) | *power*PL115/270 | 16 x 33 x 9.7 (82) | PL115/270 | 8.5 x 16.2 x 8.6 (28) | LM240 |
| 200 | 100 | 330 | 10(16) | *power*PL145/330 | 16 x 33 x 9.7 (89) | PL145/330 | 8.5 x 16.2 x 8.6 (28) | LM300 |
| 250 | 125 | 405 | 20(32) | *power*PL185/405 | 16 x 43.5 x 14.4 (143) | PL185/430 | 8.5 x 19.9 x 14.4 (43) | LM375 |
| 300 | 150 | 480 | 20(32) | *power*PL225/480 | 16 x 43.5 x 14.4 (143) | PL225/530 | 8.5 x 19.9 x 14.4 (45) | LM480 |
| 400 | 200 | 630 | 20(32) | *power*PL265/630 | 16 x 43.5 x 14.4 (154) | PL265/630 | 8.5 x 19.9 x 14.4 (45) | LM600 |

***basicDRIVES*** **must be installed with new contactor and the correct high speed SCR fuses to maintain the warranty**
***drive.web*** **options see pages 20 - 21**
**Computer RS232 Communications Cable - Drive to DB9 - part number LA102595, included with every drive**
**For details of Drive Isolation Transformers, Line Reactors and Line Filters, please call +410-604-3400**

# PL-Series Drives to 2000HP

## Models & Ratings

DC drives 400 HP to 2000 HP are normally available as ***basicDRIVES*** but can be supplied with ***powerKITS*** including:
- high speed fuses for line, armature & field
- main DC contactor.
- Line filter
- Flexible bus bar kits

(***basicDRIVES*** must be installed with new power components to maintain the warranty)

Drives are available for either 6-pulse or 12-pulse, 460 VAC or 690 VAC configurations - please call for further information.

***savvyPanel touch***
Easy HMI option

### DC Drives - 500 VDC Armature, 480VAC Supply

| HP @ | ARMATURE AMPS DC @ 40°C | FIELD AMPS DC Basic(Optional) | *basic*DRIVE 4-QUAD REGEN REVERSING | *basic*DRIVE NON-REVERSING | DIMENSIONS W x H x D (weight) INCHES (LBS) TOP CABLE ENTRY | OVERLOAD RATING |
|---|---|---|---|---|---|---|
| 400 | 650 | 32 (50) | PLX275/650 | PL275/650 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 450 | 750 | 32 (50) | PLX315/750 | PL315/750 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 500 | 850 | 32 (50) | PLX360/850 | PL360/850 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 575 | 950 | 32 (50) | PLX400/950 | PL400/950 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 650 | 1050 | 32 (50) | PLX440/1050 | PL440/1050 | 10 x 30 x 13.8 (120) | 100%, CONT |
| 750 | 1250 | 64 | PLX520/1250 | PL520/1250 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 895 | 1450 | 64 | PLX600/1450 | PL600/1450 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1000 | 1650 | 64 | PLX700/1650 | PL700/1650 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1140 | 1850 | 64 | PLX800/1850 | PL800/1850 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1260 | 2050 @35°C | 64 | PLX900/2050 | PL900/2050 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1380 | 2250 @35°C | 64 | PLX980/2250 | PL980/2250 | 20 x 30 x 13.8 (285) | 100%, CONT |

### DC Drives - 600 VDC Armature, 575VAC Supply

| | | | | | | |
|---|---|---|---|---|---|---|
| 480 | 650 | 32 (50) | PLX275MV/650 | PL275MV/650 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 550 | 750 | 32 (50) | PLX315MV/750 | PL315MV/750 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 630 | 850 | 32 (50) | PLX360MV/850 | PL360MV/850 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 700 | 950 | 32 (50) | PLX400MV/950 | PL400MV/950 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 775 | 1050 | 32 (50) | PLX440/MV1050 | PL440MV/1050 | 10 x 30 x 13.8 (120) | 100%, CONT |
| 925 | 1250 | 64 | PLX520MV/1250 | PL520MV/1250 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1075 | 1450 | 64 | PLX600MV/1450 | PL600MV/1450 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1220 | 1650 | 64 | PLX700MV/1650 | PL700MV/1650 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1370 | 1850 | 64 | PLX800MV/1850 | PL800MV/1850 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1510 | 2050 @35°C | 64 | PLX900MV/2050 | PL900MV/2050 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1660 | 2250 @35°C | 64 | PLX980MV/2250 | PL980MV/2250 | 20 x 30 x 13.8 (285) | 100%, CONT |

### DC Drives - 700 VDC Armature, 690VAC Supply

| | | | | | | |
|---|---|---|---|---|---|---|
| 550 | 650 | 32 (50) | PLX275HV/650 | PL275HV/650 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 650 | 750 | 32 (50) | PLX315HV/750 | PL315HV/750 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 735 | 850 | 32 (50) | PLX360HV/850 | PL360HV/850 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 820 | 950 | 32 (50) | PLX400HV/950 | PL400HV/950 | 10 x 30 x 13.8 (120) | 150%, 25 SECS |
| 900 | 1050 | 32 (50) | PLX440HV/1050 | PL440HV/1050 | 10 x 30 x 13.8 (120) | 100%, CONT |
| 1080 | 1250 | 64 | PLX520HV/1250 | PL520HV/1250 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1250 | 1450 | 64 | PLX600HV/1450 | PL600HV/1450 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1420 | 1650 | 64 | PLX700HV/1650 | PL700HV/1650 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1600 | 1850 | 64 | PLX800HV/1850 | PL800HV/1850 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1770 | 2050 @35°C | 64 | PLX900HV/2050 | PL900HV/2050 | 20 x 30 x 13.8 (285) | 150%, 25 SECS |
| 1940 | 2250 @35°C | 64 | PLX980HV/2250 | PL980HV/2250 | 20 x 30 x 13.8 (285) | 100%, CONT |

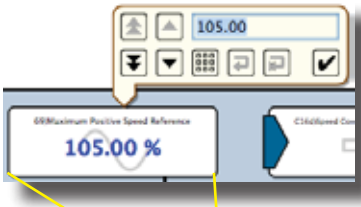
## PLXD Separate Stack Controller

The PLXD is a great retrofit option for controlling large separate SCR stacks in either 6 or 12-pulse DC drive configurations and also for wound rotor motor SCR stack control. The unit has all the standard PL/X series drive features together with:

- Available for stacks up to 690 volts AC, 700 volts DC
- Built-in 32 amps fully automatic field controller (optional 50 amps rating)
- Separate gate pulse driver unit for greater noise immunity and reliability
- Optional current transformers
- Optional Ethernet and ***drive.web*** distributed control

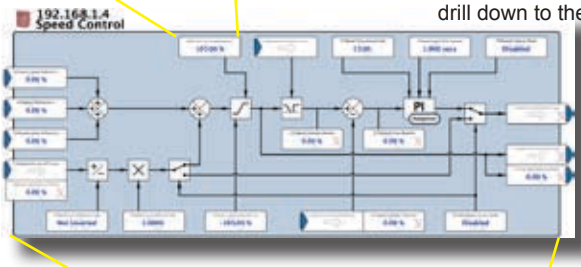
Please call for details

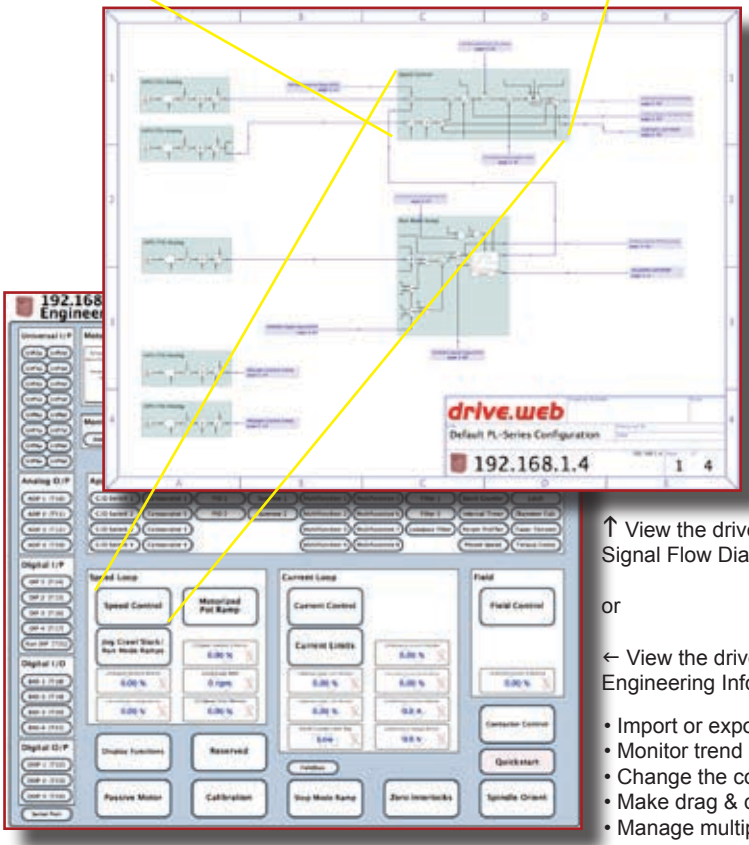
## *savvy* tools for the PL dc drives




click on a parameter to open the setter

click on a function block to drill down to the detail



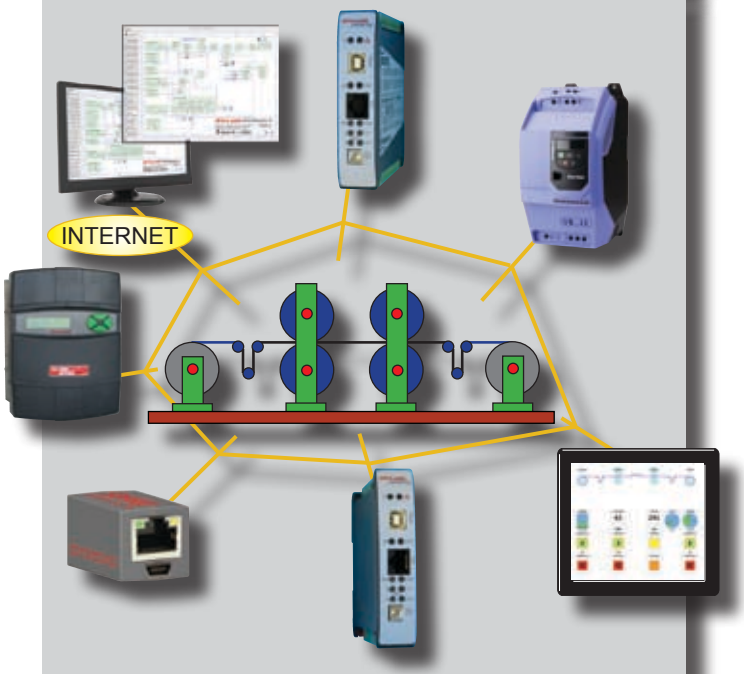

↑ View the drive Signal Flow Diagram

or

← View the drive Engineering Info window

- Import or export data
- Monitor trend charts
- Change the configuration
- Make drag & drop connections
- Manage multiple drives at the same time

## *drive.web* smart drives




Add a ***drive.web*** module to any drive for unlimited automation capability:

- Powerful programmable control functions
- Peer-to-peer networking over Ethernet
- Smart iPad or touch screen PC operation
- Internet access

***smarty*** - adds programmable control & extra i/o
***speedy*** - adds programmable control & gateway

- Get clear graphical signal flow system diagrams.
- Send event driven emails from your drive.
- All in one unique, intuitive, environment.

***drive.web automation***

- Intuitive
- Easy
- Reliable
- Very smart!

# *power*SL Series
## Analog DC drives - up to 200 hp

The ***power***SL Series of dc drives incorporate the well proven SLX, SL & SLE 3-phase basic OEM chassis drives into a compact package, complete with high speed 3-phase power fuses, armature fuses (SLX & SL models only), control power fuses, contactor, and other features.

Easy access to all internal power components and terminals is achieved in a compact, elegant package which, at 75hp is as small as a 8¹/2" x 11" note pad and is less than 10¹/2" deep!

***power*SLX Series ...** 4-Q regenerative, reversing DC systems drive with field controller
***power*SL Series ...** Non-reversing DC systems drive with field controller
***power*SLE Series ...** Non-reversing DC OEM drive.

### Standard Features

| SL | SLX | SLE | | |
|---|---|---|---|---|
| • | • | | Field controller with automatic field weakening | |
| | | • | Configurable field bridge | |
| • | • | • | Heat sink thermostat protection | |
| • | • | | Diagnostic test socket | |
| • | • | • | 50/60Hz autoranging | |
| • | • | • | Power supply range: 208-240 or 380-480 volts +/-10% | |
| • | • | • | Auxiliary control power input: 115 volts 50/60Hz. | |
| • | • | • | Phase rotation insensitivity | |
| • | • | • | Linear torque control | |
| • | • | • | Armature voltage or tach feedback | |
| • | • | • | Calibration range switches (no component change) | |
| • | • | • | Speed reference +/-10V or 4-20mA | |
| • | • | • | Speed trim input | |
| • | • | • | Maximum and minimum speed settings | |
| • | • | • | Adjustable up & down ramps | |
| • | • | • | Adjustable current limit | |
| • | • | • | Current range selectable for multiple horsepower's | |
| • | • | • | Torque control | |
| • | • | • | 150% overload capacity with 30 second stall timer | |
| • | • | • | Relay outputs: Stall, Zero speed, Overload | |
| • | • | | Regen stop (SLX 4-quad. regen drive) | |
| • | • | • | Setpoint ramp reset | |
| • | • | • | Start inhibit after power loss | |
| | | | LED indicators: | |
| • | • | • | Stall | Stall Timer |
| • | • | | +/- Current | Field Loss |
| • | • | | Tach Loss | Peak Amps |
| • | • | • | Ext. Trip | Power On |
| • | • | | 25%, 50%, 95% | Field Volts |
| • | • | • | Speed signal output | |
| • | • | • | Current signal output | |
| • | • | • | Ramp & Total demand signal outputs | |
| • | • | • | Shunt wound or permanent magnet motors | |
| • | • | • | Stability adjustment | |
| • | • | | Current reduction for low power test | |

### Protection & Control

| | | | |
|---|---|---|---|
| • | • | • | Control fuses |
| • | • | • | 3-Phase high speed semiconductor fuses |
| • | • | • | Armature high speed semiconductor fuse |
| • | • | • | Main AC line contactor |

**SLE44/106**, 60hp DC Drive

***power*SLX50/122**, 75hp regen DC Drive

### SL Series Non-Regen DC Drives & SLX Series 4Q Regen DC Drives

| powerDRIVE Model | basicDRIVE Model | 500VDC Arm | 240VDC Arm | Armature Current | Line reactor | Drive Isolation Transformer |
|---|---|---|---|---|---|---|
| ***power*SL & SLX15** | SL & SLX15 | 20hp | 10hp | 36 amps | LM37 | DIT27** |
| ***power*SL & SLX20** | SL & SLX20 | 30hp | 13hp | 51 amps | LM52 | DIT40** |
| ***power*SL & SLX40** | SL & SLX40 | 60hp | 25hp | 99 amps | LM120 | DIT75** |
| ***power*SL & SLX50** | SL & SLX50 | 75hp | 35hp | 122 amps | LM120 | DIT93** |

Field current controlled up to 5 amps
Dimensions: basicDRIVE 9.8" high x 8" wide x 5.6" deep (248mm x 203mm x 143mm)
Dimensions: powerDRIVE 11" high x 8" wide x 10.4" deep (280mm x 203mm x 265mm)

### SLE Series ... Non-reversing OEM drive

| powerDRIVE Model | basicDRIVE Model | 500VDC Arm | 240VDC Arm | Armature Current | Line reactor | Drive Isolation Transformer |
|---|---|---|---|---|---|---|
| ***power*SLE14** | SLE14 | 20hp | 10hp | 34 amps | LM37 | DIT27** |
| ***power*SLE24** | SLE24 | 30hp | 15hp | 58 amps | LM52 | DIT40** |
| ***power*SLE34** | SLE34 | 50hp | 20hp | 82 amps | LM82 | DIT63** |
| ***power*SLE44** | SLE34 | 60hp | 30hp | 106 amps | LM120 | DIT75** |

Field current up to 2.5 amps
Dimensions: basicDRIVE 11.5" high x 8.5" wide x 6.1" deep (290mm x 215mm x 155mm)
Dimensions: powerDRIVE 11.5" high x 8.5" wide x 9.4" deep (290mm x 215mm x 240mm)

## Power Quality For DC Drives

### Drive Isolation Transformers

Standard specification:
NEMA 1 enclosed for indoor use
K-factor 4
Windings: Delta Primary, Wye Secondary
Aluminum or Copper windings as indicated
Taps at ± 5%
Approvals: UL, C-UL

Options
Outdoor enclosures
Frequencies other than 60Hz
Voltages other than 230/460/575 pri, 230/460 sec
Special Taps
Fungus Proofing
80°C & 115°C Rise
Copper Windings
Electrostatic Shield
K-13, K-20, K-30

Discount Schedule SX-1

| Model | Specification |
|---|---|
| DIT3** | 3KVA - Cu (2hp) |
| DIT6** | 6KVA - Cu (5hp) |
| DIT11** | 11KVA - Al (7.5hp) |
| DIT14** | 14KVA - Al (10hp) |
| DIT20** | 20KVA - Al (15hp) |
| DIT27** | 27KVA - Al (20hp) |
| DIT34** | 34KVA - Al (25hp) |
| DIT40** | 40KVA - Al (30hp) |
| DIT51** | 51KVA - Al (40hp) |
| DIT63** | 63KVA - Al (50hp) |
| DIT75** | 75KVA - Al (60hp) |
| DIT93** | 93KVA - Al (75hp) |
| DIT118** | 118KVA - Al (100hp) |
| DIT145** | 145KVA - Al (125hp) |
| DIT175** | 175KVA - Al (150hp) |
| DIT220** | 220KVA - Al (200hp |
| DIT275** | 275KVA - Al (250hp) |
| DIT330** | 330KVA - Al (300hp) |
| DIT440** | 440KVA - Al (400hp) |
| DIT550** | 550KVA - Al (500hp) |
| DIT660** | 660KVA - Al (600hp) |

### Line Reactors For 3-Phase DC Drives

| Model Number | hp. at 230V | hp. at 460V | Arm Amps | Dimensions W x D x H | Mount Holes H x W | Weight LBS |
|---|---|---|---|---|---|---|
| LM18 | 5 | 10 | 20 | 6.0"x4.8"x3.1" | 2.1"x2.0" | 9 |
| LM37 | 10 | 20 | 41 | 7.2"x5.6"x3.4" | 2.3"x3.0" | 11 |
| LM52 | 15 | 30 | 58 | 7.2"x5.6"x3.8" | 2.6"x3.0" | 14 |
| LM67 | 20 | 40 | 75 | 9.0"x7.0"x4.8" | 3.2"x3.0" | 23 |
| LM82 | 25 | 50 | 91 | 9.0"x7.0"x4.8" | 3.2"x3.0" | 24 |
| LM120 | 35 | 75 | 133 | 10.8"x8.2"x5.6" | 3.5"x3.6" | 43 |
| LM150 | 40 | 100 | 166 | 10.8"x8.3"x5.6" | 3.5"x3.6" | 47 |
| LM195 | 60 | 125 | 216 | 9.0"x7.1"x4.9" | 3.2"x3.0" | 29 |
| LM240 | 75 | 150 | 266 | 10.8"x8.4"x5.8" | 3.2"x3.6" | 40 |
| LM300 | | 200 | 333 | 10.8"x8.4"x6.0" | 4.2"x3.6" | 48 |
| LM375 | 100 | 250 | 416 | 10.8"x8.2"x7.3" | 4.2"x3.6" | 68 |
| LM480 | 150 | 300 | 533 | 14.8"x14.0"x10.2" | 5.9"x4.6" | 125 |
| LM600 | | 400 | 666 | 15.5"x14.0"x11.5" | 6.8"x4.6" | 155 |
| LM750 | 200 | 500 | 833 | 15.5"x14.0"x13.0" | 6.8"x4.6" | 180 |
| LM900 | | 600 | 1000 | 15.5"x14.0"x15.5" | 9.3"x4.6" | 290 |
| LM1125 | | 750 | 1250 | 22.0"x20.0"x14.8" | 9.5"x7.2" | 400 |

### Line Filter

| | |
|---|---|
| LF3 | Line Filter |
| LF3-FK | Line Filter Fuse Kit |

# Engineering & Support

## AC and DC motors from fractional to over 2000 HP

All speed ranges, duties, enclosures and voltages complete with a full range of accessories such as encoders, tachs, thermal protection, brakes, blowers, filters, brushes and slide bases. Please call for details and competitive pricing.

## *Modulus* Packaged Drives

***Modulus*** solutions are a range of standard, pre-engineered drive packages with a selection of options for wide range common applications.

Using the flexible ***drive.web*** programmable automation technology it is possible to adapt a small range of hardware configurations to a wide range of applications thereby keeping design and manufacturing costs to a minimum.

***Modulus*** drives are available either as packages mounted on an open panel, ***Modulus P***, or as assemblies installed in an enclosure, ***Modulus E***, to suit the type of operating environment and the control scheme required.

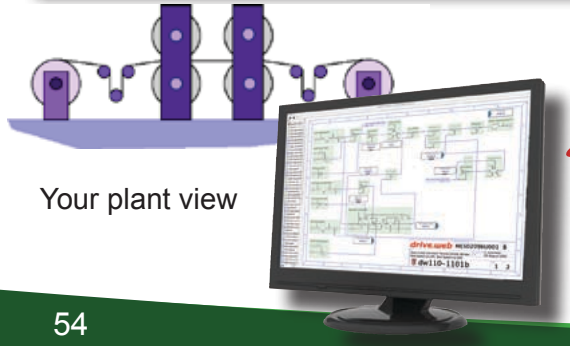
Every ***Modulus*** project is accompanied by a detailed, 50-point, Quality Control Report covering every facet of the product, its design, construction, testing and shipping.

## User manuals for all products are available from www.bardac.com

## Online Product Support

Using innovative, interactive, Internet online technologies we can provide either product training or product support through your browser from the comfort of your desk! Simply connect via your browser and get live interactive support where ever you are - with savvy running on your computer call +410-604-3400 and in less than a minute an engineer will be able to see your system live and give you the support you need.

***... it's as easy as that!***



Your plant view

Internet

***Unbeatable!***

Our support view

# Online Training

Online product training courses are scheduled every week with options for users of all levels of interest and ability.

**Level 1 - drive.web introductory seminar - 1½ hours - Free!**

This provides an overview of the ***drive.web*** automation technology. Learn how to connect to drives, create drive "phantoms", navigate systems, create signal flow diagrams and system drawings, find information, identify object attributes, make connections, show trend charts, build ***savvyPanel*** operator stations, etc.

**Level 2 - drive.web design technology course - 3 hours (Level 1 is a prerequisite)**

Covers configuration of drives, basic system design concepts, Ethernet networking, password protection, system safety

**Level 3 - drive.web system design and application courses (Level 2 is a prerequisite)**

**3a) Drive and device interfaces - 2 hours**

Covers the use of "Templates" and "Helpers" for documented drives, generic ModbusRTU master interfaces to third party drives, operator stations, etc.

**3b) Winder Control Systems - 3 hours**

Covers standard solutions for open loop CTCW winders, closed loop dancer controlled winders and closed loop loadcell controlled winders.

**3c) Encoder Control Systems - 3 hours**

Covers applications such as "electronic line shaft", spindle orientation, registration and position control.

**3d) Advanced Ethernet, Internet Access and Security - 3 hours**

Covers local and wide area network configuration, IP addressing, user access and device and system password protection.

For course details, registration, international training options and charges please call us at 1-888-667-7333 (toll free USA 888-ON SPEED) or international at +410-604-3400. Alternatively please contact training@driveweb.com

## Terms of Sale & Payment

Complete Terms & Conditions of Sale are shown at www.bardac.com. Net 30 day credit terms are available subject to prior approval. Credit card payments are only accepted for payments made at the time of service or shipment of products and will be subject to a 4% surcharge.

## Field Service, Service Center Repair, Training and Start-up - Call +410-604-3400
## Rates for the Continental United States

| Charge Basis | Rates (US$) |
|---|---|
| a. Basic Rate - Field Service, Training & Start-up Assistance - up to 8 hours daily Monday to Friday, 7am to 6pm | $150 per hour |
| b. Standard Overtime - Weekdays 6pm to 7am & all day Saturday - Total work time not to exceed 12 hrs in any 24 hrs | $225 per hour |
| c. Special Overtime - Sundays, Holidays and excess of 8 hours on Saturday | $300 per hour |
| d. Overnight - Includes meals, and hotel accommodation | $225 per night |
| e. Auto Travel - Covering cost of use of company or personal cars, distance to and from the local office | $0.55 per mile |
| f. Public Transport - Rental cars, Air fares, etc. | At Cost |
| g. Holdover & Standby Time | Same as service |
| h. Travel Time - Time taken from Bardac to job site and return | Same as service |
| i. Basic Rate - Service Center Repair charges - Diagnosis & repair time | $95 per hour + parts |
| j. Design or application engineering services | $150 per hour |

Notes:
1. Minimum service billing is 4 hours for field services, 1 hour for service center services.
2. Parts, materials, special visas, duties, and extraordinary expenses will be charged extra.
3. Warranty credits will be identified on the Daily Field Service Report.

For rates and availability of sales and service outside the US, please call +410-604-3400

## 24/7 Tech Support

During normal business hours basic tech support will be provided free of charge
Outside normal business hours call +410-604-3535. Tech support will be provided at $300/hour (minimum of 1/2 hour per call) and this must be paid for with a credit card at the time of service.

## *Everything normally in stock!*

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**Bardac Corporation**
40 Log Canoe Circle
Stevensville, MD 21666 USA
www.bardac.com
www.driveweb.com
Phone International +410-604-3400
Phone US Toll Free 1-888-667-7333
1-888-ON SPEED
Fax +410-604-3500


Catalog 2015.2